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LAMPIRAN

Lampiran 1. Titik Kesetimbangan Model Penyebaran Difteri Menggunakan Maple

```
> restart;
> with(linalg) :
> with(plots) : with(linalg) : with(VectorCalculus) :
> dS1 := A + η·R_p - (1 - u_1·ω)·β·S·(I_s + I_a) - u_1·ω·S - μ·S
```

$$dS1 := \eta R_p + A - (-\omega u_1 + 1)\,\beta S\,(I_s + I_a) - u_1\,\omega S - \mu S$$

```
> dL1 := (1 - u_1·ω)·β·S·(I_s + I_a) - (δ + μ)·L
```

$$dL1 := (-\omega u_1 + 1)\,\beta S\,(I_s + I_a) - (\delta + \mu)\,L$$

```
> dI1 := (1 - n)·δ·L - (1 + u_2·τ)·θ·I_s - (μ + α)·I_s
```

$$dI1 := (1 - n)\,\delta L - (\tau u_2 + 1)\,\theta I_s - (\mu + \alpha)\,I_s$$

```
> dA1 := n·δ·L - (1 + u_2·τ)·γ·I_a - μ·I_a
```

$$dA1 := n\,\delta L - (\tau u_2 + 1)\,\gamma I_a - \mu I_a$$

```
>
> dR1 := m·(1 + u_2·τ)·θ·I_s + u_1·ω·S - (ρ + μ)·R_f
```

$$dR1 := m\,(\tau u_2 + 1)\,\theta I_s + u_1\,\omega S - (\rho + \mu)\,R_f$$

```
> dR2 := (1 - m)·(1 + u_2·τ)·θ·I_s + (1 + u_2·τ)·γ·I_a + ρ·R_f - (η + μ)·R_p
```

$$dR2 := (1 - m)\,(\tau u_2 + 1)\,\theta I_s + (\tau u_2 + 1)\,\gamma I_a + \rho R_f - (\eta + \mu)\,R_p$$

```
> dN := dS1 + dL1 + dA1 + dI1 + dR1 + dR2
```

$$dN := \eta R_p + A - \mu S - (\delta + \mu)\,L + n\,\delta L - \mu I_a + (1 - n)\,\delta L - (\tau u_2 + 1)\,\theta I_s - (\mu + \alpha)\,I_s + m\,(\tau u_2 + 1)\,\theta I_s - (\rho + \mu)\,R_f + (1 - m)\,(\tau u_2 + 1)\,\theta I_s + \rho R_f - (\eta + \mu)\,R_p$$

```
> simplify(dN)
```

$$-L\,\mu - S\mu - \alpha I_s - \mu I_a - \mu I_s - \mu R_f - \mu R_p + A$$

```
> fixpoint := solve({dS1, dL1, dI1, dA1, dR1, dR2}, {S, L, I_s, I_a, R_f, R_p})
```

$$fixpoint := \left\{L = 0, S = \frac{(\eta\mu + \eta\rho + \mu^2 + \mu\rho)A}{(\eta\omega u_1 + \mu\omega u_1 + \omega\rho u_1 + \eta\mu + \eta\rho + \mu^2 + \mu\rho)\mu}, I_a = 0, I_s = 0, R_f\right.$$

$$\left. = \frac{A(\eta + \mu)\omega u_1}{(\eta\omega u_1 + \mu\omega u_1 + \omega\rho u_1 + \eta\mu + \eta\rho + \mu^2 + \mu\rho)\mu}, R_p = \frac{A\omega\rho u_1}{(\eta\omega u_1 + \mu\omega u_1 + \omega\rho u_1 + \eta\mu + \eta\rho + \mu^2 + \mu\rho)\mu}\right\}, \left\{L\right.$$

$$= -\left(\left(A\beta\delta\eta\gamma\mu n\omega\tau^2\theta u_1 \iota_2^2 + A\beta\delta\eta\gamma n\omega\rho\tau^2\theta u_1 \iota_2^2 - A\beta\delta\eta\mu n\omega\tau^2\theta^2 u_1 \iota_2^2 - A\beta\delta\eta n\omega\rho\tau^2\theta^2 u_1 \iota_2^2\right.\right.$$

$$+ A\beta\delta\gamma\mu^2 n\omega\tau^2\theta u_1 \iota_2^2 + A\beta\delta\gamma\mu n\omega\rho\tau^2\theta u_1 \iota_2^2 - A\beta\delta\mu^2 n\omega\tau^2\theta^2 u_1 \iota_2^2 - A\beta\delta\mu n\omega\rho\tau^2\theta^2 u_1 \iota_2^2 - \delta\eta\gamma\mu\omega\tau^3\theta^2 u_1 \iota_2^3$$

$$- \delta\gamma\mu^2\omega\tau^3\theta^2 u_1 \iota_2^3 - \delta\gamma\mu\omega\rho\tau^3\theta^2 u_1 \iota_2^3 - \eta\gamma\mu^2\omega\tau^3\theta^2 u_1 \iota_2^3 - \gamma\mu^3\omega\tau^3\theta^2 u_1 \iota_2^3 - \gamma\mu^2\omega\rho\tau^3\theta^2 u_1 \iota_2^3$$

$$- A\beta\delta\eta\gamma\mu\omega\tau^2\theta u_1 \iota_2^2 - A\beta\delta\eta\gamma\omega\rho\tau^2\theta u_1 \iota_2^2 - A\beta\delta\gamma\mu^2\omega\tau^2\theta u_1 \iota_2^2 - A\beta\delta\gamma\mu\omega\rho\tau^2\theta u_1 \iota_2^2 - \delta\eta\gamma\mu^2\tau^3\theta^2 \iota_2^3$$

$$- \delta\eta\gamma\mu\rho\tau^3\theta^2 \iota_2^3 - \delta\gamma\mu^3\tau^3\theta^2 \iota_2^3 - \delta\gamma\mu^2\rho\tau^3\theta^2 \iota_2^3 - \eta\gamma\mu^3\tau^3\theta^2 \iota_2^3 - \eta\gamma\mu^2\rho\tau^3\theta^2 \iota_2^3 - \gamma\mu^4\tau^3\theta^2 \iota_2^3 - \gamma\mu^3\rho\tau^3\theta^2 \iota_2^3$$

$$+ A\alpha\beta\delta\eta\gamma\mu n\omega\tau u_1 u_2 + A\alpha\beta\delta\eta\gamma n\omega\rho\tau u_1 u_2 - 2A\alpha\beta\delta\eta\mu n\omega\tau\theta u_1 u_2 - 2A\alpha\beta\delta\eta n\omega\rho\tau\theta u_1 u_2$$

$$+ A\alpha\beta\delta\gamma\mu n\omega\rho\tau u_1 u_2 - 2A\alpha\beta\delta\mu^2 n\omega\tau\theta u_1 u_2 - 2A\alpha\beta\delta\mu n\omega\rho\tau\theta u_1 u_2 + A\beta\delta\eta\gamma\mu^2 n\omega\tau u_1 u_2 + A\beta\delta\eta\gamma\mu n\omega\rho\tau u_1 u_2$$

$$+ 2A\beta\delta\eta\gamma\mu n\omega\tau\theta u_1 u_2 - A\beta\delta\eta\gamma\mu n\tau^2\theta \iota_2^2 + 2A\beta\delta\eta\gamma n\omega\rho\tau\theta u_1 u_2 - A\beta\delta\eta\gamma n\rho\tau^2\theta \iota_2^2 - A\beta\delta\eta\mu^2 n\omega\tau\theta u_1 u_2$$

$$- A\beta\delta\eta\mu n\omega\rho\tau\theta u_1 u_2 - 2A\beta\delta\eta\mu n\omega\tau\theta^2 u_1 u_2 + A\beta\delta\eta\mu n\tau^2\theta^2 \iota_2^2 - 2A\beta\delta\eta n\omega\rho\tau\theta^2 u_1 u_2 + A\beta\delta\eta n\rho\tau^2\theta^2 \iota_2^2$$

$$+ A\beta\delta\gamma\mu^3 n\omega\tau u_1 u_2 + A\beta\delta\gamma\mu^2 n\omega\rho\tau u_1 u_2 + 2A\beta\delta\gamma\mu^2 n\omega\tau\theta u_1 u_2 - A\beta\delta\gamma\mu^2 n\tau^2\theta \iota_2^2 + 2A\beta\delta\gamma\mu n\omega\rho\tau\theta u_1 u_2$$

$$- A\beta\delta\gamma\mu n\rho\tau^2\theta \iota_2^2 - A\beta\delta\mu^3 n\omega\tau\theta u_1 u_2 - A\beta\delta\mu^2 n\omega\rho\tau\theta u_1 u_2 - 2A\beta\delta\mu^2 n\omega\tau\theta^2 u_1 u_2 + A\beta\delta\mu^2 n\tau^2\theta^2 \iota_2^2$$

$$- 2A\beta\delta\mu n\omega\rho\tau\theta^2 u_1 u_2 + A\beta\delta\mu n\rho\tau^2\theta^2 \iota_2^2 - 2\alpha\delta\eta\gamma\mu\omega\tau^2\theta u_1 \iota_2^2 - 2\alpha\delta\gamma\mu^2\omega\tau^2\theta u_1 \iota_2^2 - 2\alpha\delta\gamma\mu\omega\rho\tau^2\theta u_1 \iota_2^2$$

$$- 2\alpha\eta\gamma\mu^2\omega\tau^2\theta u_1 \iota_2^2 - 2\alpha\gamma\mu^3\omega\tau^2\theta u_1 \iota_2^2 - 2\alpha\gamma\mu^2\omega\rho\tau^2\theta u_1 \iota_2^2 - 2\delta\eta\gamma\mu^2\omega\tau^2\theta u_1 \iota_2^2 - 3\delta\eta\gamma\mu\omega\tau^2\theta^2 u_1 \iota_2^2$$

$$- \delta\eta\mu^2\omega\tau^2\theta^2 u_1 \iota_2^2 - 2\delta\gamma\mu^3\omega\tau^2\theta u_1 \iota_2^2 - 2\delta\gamma\mu^2\omega\rho\tau^2\theta u_1 \iota_2^2 - 3\delta\gamma\mu^2\omega\tau^2\theta^2 u_1 \iota_2^2 - 3\delta\gamma\mu\omega\rho\tau^2\theta^2 u_1 \iota_2^2 - \delta\mu^3\omega\tau^2\theta^2 u_1$$

$$\iota_2^2 - \delta\mu^2\omega\rho\tau^2\theta^2 u_1 \iota_2^2 - 2\eta\gamma\mu^3\omega\tau^2\theta u_1 \iota_2^2 - 3\eta\gamma\mu^2\omega\tau^2\theta^2 u_1 \iota_2^2 - \eta\mu^3\omega\tau^2\theta^2 u_1 \iota_2^2 - 2\gamma\mu^4\omega\tau^2\theta u_1 \iota_2^2 - 2\gamma\mu^3\omega\rho\tau^2\theta u_1 \iota_2^2$$

$$- 3\gamma\mu^3\omega\tau^2\theta^2 u_1 \iota_2^2 - 3\gamma\mu^2\omega\rho\tau^2\theta^2 u_1 \iota_2^2 - \mu^4\omega\tau^2\theta^2 u_1 \iota_2^2 - \mu^3\omega\rho\tau^2\theta^2 u_1 \iota_2^2 - A\alpha\beta\delta\eta\gamma\mu\omega\tau u_1 u_2 - A\alpha\beta\delta\eta\gamma\omega\rho\tau u_1 u_2$$

$$- A\alpha\beta\delta\gamma\mu^2\omega\tau u_1 u_2 - A\alpha\beta\delta\gamma\mu\omega\rho\tau u_1 u_2 - A\beta\delta\eta\gamma\mu^2\omega\tau u_1 u_2 - A\beta\delta\eta\gamma\mu\omega\rho\tau u_1 u_2 - 2A\beta\delta\eta\gamma\mu\omega\tau\theta u_1 u_2$$

$$+ A\beta\delta\eta\gamma\mu\tau^2\theta \iota_2^2 - 2A\beta\delta\eta\gamma\omega\rho\tau\theta u_1 u_2 + A\beta\delta\eta\gamma\rho\tau^2\theta \iota_2^2 - A\beta\delta\eta\mu^2\omega\tau\theta u_1 u_2 - A\beta\delta\eta\mu\omega\rho\tau\theta u_1 u_2$$

$$- A\beta\delta\gamma\mu^3\omega\tau u_1 u_2 - A\beta\delta\gamma\mu^2\omega\rho\tau u_1 u_2 - 2A\beta\delta\gamma\mu^2\omega\tau\theta u_1 u_2 + A\beta\delta\gamma\mu^2\tau^2\theta \iota_2^2 - 2A\beta\delta\gamma\mu\omega\rho\tau\theta u_1 u_2$$

$$+ A\beta\delta\gamma\mu\rho\tau^2\theta \iota_2^2 - A\beta\delta\mu^3\omega\tau\theta u_1 u_2 - A\beta\delta\mu^2\omega\rho\tau\theta u_1 u_2 - 2\alpha\delta\eta\gamma\mu^2\tau^2\theta \iota_2^2 - 2\alpha\delta\eta\gamma\mu\rho\tau^2\theta \iota_2^2 - 2\alpha\delta\gamma\mu^3\tau^2\theta \iota_2^2$$

$$- 2\alpha\delta\gamma\mu^2\rho\tau^2\theta \iota_2^2 - 2\alpha\eta\gamma\mu^3\tau^2\theta \iota_2^2 - 2\alpha\eta\gamma\mu^2\rho\tau^2\theta \iota_2^2 - 2\alpha\gamma\mu^4\tau^2\theta \iota_2^2 - 2\alpha\gamma\mu^3\rho\tau^2\theta \iota_2^2 - 2\delta\eta\gamma\mu^3\tau^2\theta \iota_2^2$$

$$-4\alpha\delta\gamma\mu\omega\rho\tau\theta u_1 u_2 - 2\alpha\delta\mu^3\omega\tau\theta u_1 u_2 - 2\alpha\delta\mu^2\omega\rho\tau\theta u_1 u_2 - 2\alpha\eta\gamma\mu^3\omega\tau u_1 u_2 - 4\alpha\eta\gamma\mu^2\omega\tau\theta u_1 u_2$$

$$-2\alpha\eta\mu^3\omega\tau\theta u_1 u_2 - 2\alpha\gamma\mu^4\omega\tau u_1 u_2 - 2\alpha\gamma\mu^3\omega\rho\tau u_1 u_2 - 4\alpha\gamma\mu^3\omega\tau\theta u_1 u_2 - 4\alpha\gamma\mu^2\omega\rho\tau\theta u_1 u_2 - 2\alpha\mu^4\omega\tau\theta u_1 u_2$$

$$-2\alpha\mu^3\omega\rho\tau\theta u_1 u_2 - \delta\eta\gamma\mu^3\omega\tau u_1 u_2 - 4\delta\eta\gamma\mu^2\omega\tau\theta u_1 u_2 - 3\delta\eta\gamma\mu\omega\tau\theta^2 u_1 u_2 - 2\delta\eta\mu^3\omega\tau\theta u_1 u_2 - 2\delta\eta\mu^2\omega\tau\theta^2 u_1 u_2$$

$$-\delta\gamma\mu^4\omega\tau u_1 u_2 - \delta\gamma\mu^3\omega\rho\tau u_1 u_2 - 4\delta\gamma\mu^3\omega\tau\theta u_1 u_2 - 4\delta\gamma\mu^2\omega\rho\tau\theta u_1 u_2 - 3\delta\gamma\mu^2\omega\tau\theta^2 u_1 u_2 - 3\delta\gamma\mu\omega\rho\tau\theta^2 u_1 u_2$$

$$-2\delta\mu^4\omega\tau\theta u_1 u_2 - 2\delta\mu^3\omega\rho\tau\theta u_1 u_2 - 2\delta\mu^3\omega\tau\theta^2 u_1 u_2 - 2\delta\mu^2\omega\rho\tau\theta^2 u_1 u_2 - \eta\gamma\mu^4\omega\tau u_1 u_2 - 4\eta\gamma\mu^3\omega\tau\theta u_1 u_2$$

$$-3\eta\gamma\mu^2\omega\tau\theta^2 u_1 u_2 - 2\eta\mu^4\omega\tau\theta u_1 u_2 - 2\eta\mu^3\omega\tau\theta^2 u_1 u_2 - \gamma\mu^5\omega\tau u_1 u_2 - \gamma\mu^4\omega\rho\tau u_1 u_2 - 4\gamma\mu^4\omega\tau\theta u_1 u_2$$

$$-4\gamma\mu^3\omega\rho\tau\theta u_1 u_2 - 3\gamma\mu^3\omega\tau\theta^2 u_1 u_2 - 3\gamma\mu^2\omega\rho\tau\theta^2 u_1 u_2 - 2\mu^5\omega\tau\theta u_1 u_2 - 2\mu^4\omega\rho\tau\theta u_1 u_2 - 2\mu^4\omega\tau\theta^2 u_1 u_2$$

$$-2\mu^3\omega\rho\tau\theta^2 u_1 u_2 - A\alpha\beta\delta\eta\gamma\mu\omega u_1 + A\alpha\beta\delta\eta\gamma\mu\tau u_2 - A\alpha\beta\delta\eta\gamma\omega\rho u_1 + A\alpha\beta\delta\eta\gamma\rho\tau u_2 - A\alpha\beta\delta\eta\mu^2\omega u_1$$

$$-A\alpha\beta\delta\eta\mu\omega\rho u_1 - A\alpha\beta\delta\gamma\mu^2\omega u_1 + A\alpha\beta\delta\gamma\mu^2\tau u_2 - A\alpha\beta\delta\gamma\mu\omega\rho u_1 + A\alpha\beta\delta\gamma\mu\rho\tau u_2 - A\alpha\beta\delta\mu^3\omega u_1$$

$$-A\alpha\beta\delta\mu^2\omega\rho u_1 - A\beta\delta\eta\gamma\mu^2\omega u_1 + A\beta\delta\eta\gamma\mu^2\tau u_2 - A\beta\delta\eta\gamma\mu\omega\rho u_1 - A\beta\delta\eta\gamma\mu\omega\theta u_1 + A\beta\delta\eta\gamma\mu\rho\tau u_2$$

$$+2A\beta\delta\eta\gamma\mu\tau\theta u_2 - A\beta\delta\eta\gamma\omega\rho\theta u_1 + 2A\beta\delta\eta\gamma\rho\tau\theta u_2 - A\beta\delta\eta\mu^3\omega u_1 - A\beta\delta\eta\mu^2\omega\rho u_1 - A\beta\delta\eta\mu^2\omega\theta u_1$$

$$+A\beta\delta\eta\mu^2\tau\theta u_2 - A\beta\delta\eta\mu\omega\rho\theta u_1 + A\beta\delta\eta\mu\rho\tau\theta u_2 - A\beta\delta\gamma\mu^3\omega u_1 + A\beta\delta\gamma\mu^3\tau u_2 - A\beta\delta\gamma\mu^2\omega\rho u_1 - A\beta\delta\gamma\mu^2\omega\theta u_1$$

$$+A\beta\delta\gamma\mu^2\rho\tau u_2 + 2A\beta\delta\gamma\mu^2\tau\theta u_2 - A\beta\delta\gamma\mu\omega\rho\theta u_1 + 2A\beta\delta\gamma\mu\rho\tau\theta u_2 - A\beta\delta\mu^4\omega u_1 - A\beta\delta\mu^3\omega\rho u_1 - A\beta\delta\mu^3\omega\theta u_1$$

$$+A\beta\delta\mu^3\tau\theta u_2 - A\beta\delta\mu^2\omega\rho\theta u_1 + A\beta\delta\mu^2\rho\tau\theta u_2 - \alpha^2\delta\eta\gamma\mu^2\tau u_2 - \alpha^2\delta\eta\gamma\mu\rho\tau u_2 - \alpha^2\delta\gamma\mu^3\tau u_2 - \alpha^2\delta\gamma\mu^2\rho\tau u_2$$

$$-\alpha^2\eta\gamma\mu^3\tau u_2 - \alpha^2\eta\gamma\mu^2\rho\tau u_2 - \alpha^2\gamma\mu^4\tau u_2 - \alpha^2\gamma\mu^3\rho\tau u_2 - 2\alpha\delta\eta\gamma\mu^3\tau u_2 - 2\alpha\delta\eta\gamma\mu^2\rho\tau u_2 - 4\alpha\delta\eta\gamma\mu^2\tau\theta u_2$$

$$-4\alpha\delta\eta\gamma\mu\rho\tau\theta u_2 - 2\alpha\delta\eta\mu^3\tau\theta u_2 - 2\alpha\delta\eta\mu^2\rho\tau\theta u_2 - 2\alpha\delta\gamma\mu^4\tau u_2 - 2\alpha\delta\gamma\mu^3\rho\tau u_2 - 4\alpha\delta\gamma\mu^3\tau\theta u_2$$

$$-\eta\gamma\mu^4\rho-2\eta\gamma\mu^4\theta-2\eta\gamma\mu^3\rho\theta-\eta\gamma\mu^3\theta^2-\eta\gamma\mu^2\rho\theta^2-\eta\mu^6-\eta\mu^5\rho-2\eta\mu^5\theta-2\eta\mu^4\rho\theta-\eta\mu^4\theta^2-\eta\mu^3\rho\theta^2$$

$$-\gamma\mu^6-\gamma\mu^5\rho-2\gamma\mu^5\theta-2\gamma\mu^4\rho\theta-\gamma\mu^4\theta^2-\gamma\mu^3\rho\theta^2-\mu^7-\mu^6\rho-2\mu^6\theta-2\mu^5\rho\theta-\mu^5\theta^2-\mu^4\rho\theta^2\Big)\left(\gamma\tau u_2+\gamma+\mu\right)\Big)$$

$$\Big/\Big(\beta\left(\delta\eta\gamma^2 m\mu n^2\omega\tau^3\theta u_1 u_2^3-\delta\eta\gamma m\mu n^2\omega\tau^3\theta^2 u_1 u_2^3-2\delta\eta\gamma^2 m\mu n\omega\tau^3\theta u_1 u_2^3+\delta\eta\gamma m\mu n\omega\tau^3\theta^2 u_1 u_2^3\right.$$

$$-\alpha\delta\eta\gamma m\mu n^2\omega\tau^2\theta u_1 u_2^2+3\delta\eta\gamma^2 m\mu n^2\omega\tau^2\theta u_1 u_2^2-\delta\eta\gamma^2 m\mu n^2\tau^3\theta u_2^3+\delta\eta\gamma^2 m\mu\omega\tau^3\theta u_1 u_2^3+\delta\eta\gamma m\mu^2 n^2\omega\tau^2\theta u_1 u_2^2$$

$$-3\delta\eta\gamma m\mu n^2\omega\tau^2\theta^2 u_1 u_2^2+\delta\eta\gamma m\mu n^2\tau^3\theta^2 u_2^3-\delta\eta m\mu^2 n^2\omega\tau^2\theta^2 u_1 u_2^2-\delta\gamma^2\mu^2 n\omega\tau^3\theta u_1 u_2^3-\delta\gamma^2\mu n\omega\rho\tau^3\theta u_1 u_2^3$$

$$+\delta\gamma\mu^2 n\omega\tau^3\theta^2 u_1 u_2^3+\delta\gamma\mu n\omega\rho\tau^3\theta^2 u_1 u_2^3-\eta\gamma^2\mu^2 n\omega\tau^3\theta u_1 u_2^3-\eta\gamma^2\mu n\omega\rho\tau^3\theta u_1 u_2^3+\eta\gamma\mu^2 n\omega\tau^3\theta^2 u_1 u_2^3$$

$$+\eta\gamma\mu n\omega\rho\tau^3\theta^2 u_1 u_2^3-\gamma^2\mu^3 n\omega\tau^3\theta u_1 u_2^3-\gamma^2\mu^2 n\omega\rho\tau^3\theta u_1 u_2^3+\gamma\mu^3 n\omega\tau^3\theta^2 u_1 u_2^3+\gamma\mu^2 n\omega\rho\tau^3\theta^2 u_1 u_2^3$$

$$+\alpha\delta\eta\gamma^2\mu n^2\omega\tau^2 u_1 u_2^2+\alpha\delta\eta\gamma^2 n^2\omega\rho\tau^2 u_1 u_2^2+\alpha\delta\eta\gamma m\mu n\omega\tau^2\theta u_1 u_2^2-\alpha\delta\eta\gamma\mu n^2\omega\tau^2\theta u_1 u_2^2-\alpha\delta\eta\gamma n^2\omega\rho\tau^2\theta u_1 u_2^2$$

$$-\alpha\delta\gamma^2\mu\rho-2\alpha\delta\gamma\mu^3-2\alpha\delta\gamma\mu^2\rho-\alpha\delta\mu^4-\alpha\delta\mu^3\rho-\alpha\eta\gamma^2\mu^2-\alpha\eta\gamma^2\mu\rho-2\alpha\eta\gamma\mu^3-2\alpha\eta\gamma\mu^2\rho-\alpha\eta\mu^4$$

$$-\alpha\eta\mu^3\rho-\alpha\gamma^2\mu^3-\alpha\gamma^2\mu^2\rho-2\alpha\gamma\mu^4-2\alpha\gamma\mu^3\rho-\alpha\mu^5-\alpha\mu^4\rho-\delta\eta\gamma^2\mu^2-\delta\eta\gamma^2\mu\rho-2\delta\eta\gamma\mu^3-2\delta\eta\gamma\mu^2\rho$$

$$-\delta\eta\mu^4-\delta\eta\mu^3\rho-\delta\gamma^2\mu^3-\delta\gamma^2\mu^2\rho-\delta\gamma^2\mu^2\theta-\delta\gamma^2\mu\rho\theta-2\delta\gamma\mu^4-2\delta\gamma\mu^3\rho-2\delta\gamma\mu^3\theta-2\delta\gamma\mu^2\rho\theta-\delta\mu^5-\delta\mu^4\rho$$

$$-\delta\mu^4\theta-\delta\mu^3\rho\theta-\eta\gamma^2\mu^3-\eta\gamma^2\mu^2\rho-\eta\gamma^2\mu^2\theta-\eta\gamma^2\mu\rho\theta-2\eta\gamma\mu^4-2\eta\gamma\mu^3\rho-2\eta\gamma\mu^3\theta-2\eta\gamma\mu^2\rho\theta-\eta\mu^5$$

$$-\eta\mu^4\rho-\eta\mu^4\theta-\eta\mu^3\rho\theta-\gamma^2\mu^4-\gamma^2\mu^3\rho-\gamma^2\mu^3\theta-\gamma^2\mu^2\rho\theta-2\gamma\mu^5-2\gamma\mu^4\rho-2\gamma\mu^4\theta-2\gamma\mu^3\rho\theta-\mu^6-\mu^5\rho-\mu^5\theta$$

$$\left.-\mu^4\rho\theta\right)\delta\Big),S=\left(\delta\gamma\tau^2\theta u_2^2+\gamma\mu\tau^2\theta u_2^2+\alpha\delta\gamma\tau u_2+\alpha\gamma\mu\tau u_2+\delta\gamma\mu\tau u_2+2\delta\gamma\tau\theta u_2+\delta\mu\tau\theta u_2+\gamma\mu^2\tau u_2\right.$$

$$-2A\beta\delta\mu n\omega\rho\tau\theta^2 u_1 u_2 + A\beta\delta\mu n\rho\tau^2\theta^2 u_2^2 - 2\alpha\delta\eta\gamma\mu\omega\tau^2\theta u_1 u_2^2 - 2\alpha\delta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2 - 2\alpha\delta\gamma\mu\omega\rho\tau^2\theta u_1 u_2^2$$

$$-2\alpha\eta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2 - 2\alpha\gamma\mu^3\omega\tau^2\theta u_1 u_2^2 - 2\alpha\gamma\mu^2\omega\rho\tau^2\theta u_1 u_2^2 - 2\delta\eta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2 - 3\delta\eta\gamma\mu\omega\tau^2\theta^2 u_1 u_2^2$$

$$-\delta\eta\mu^2\omega\tau^2\theta^2 u_1 u_2^2 - 2\delta\gamma\mu^3\omega\tau^2\theta u_1 u_2^2 - 2\delta\gamma\mu^2\omega\rho\tau^2\theta u_1 u_2^2 - 3\delta\gamma\mu^2\omega\tau^2\theta^2 u_1 u_2^2 - 3\delta\gamma\mu\omega\rho\tau^2\theta^2 u_1 u_2^2 - \delta\mu^3\omega\tau^2\theta^2 u_1$$

$$u_2^2 - \delta\mu^2\omega\rho\tau^2\theta^2 u_1 u_2^2 - 2\eta\gamma\mu^3\omega\tau^2\theta u_1 u_2^2 - 3\eta\gamma\mu^2\omega\tau^2\theta^2 u_1 u_2^2 - \eta\mu^3\omega\tau^2\theta^2 u_1 u_2^2 - 2\gamma\mu^4\omega\tau^2\theta u_1 u_2^2 - 2\gamma\mu^3\omega\rho\tau^2\theta u_1 u_2^2$$

$$-3\gamma\mu^3\omega\tau^2\theta^2 u_1 u_2^2 - 3\gamma\mu^2\omega\rho\tau^2\theta^2 u_1 u_2^2 - \mu^4\omega\tau^2\theta^2 u_1 u_2^2 - \mu^3\omega\rho\tau^2\theta^2 u_1 u_2^2 - A\alpha\beta\delta\eta\gamma\mu\omega\tau u_1 u_2 - A\alpha\beta\delta\eta\gamma\omega\rho\tau u_1 u_2$$

$$-A\alpha\beta\delta\gamma\mu^2\omega\tau u_1 u_2 - A\alpha\beta\delta\gamma\mu\omega\rho\tau u_1 u_2 - A\beta\delta\eta\gamma\mu^2\omega\tau u_1 u_2 - A\beta\delta\eta\gamma\mu\omega\rho\tau u_1 u_2 - 2A\beta\delta\eta\gamma\mu\omega\tau\theta u_1 u_2$$

$$+A\beta\delta\eta\gamma\mu\tau^2\theta u_2^2 - 2A\beta\delta\eta\gamma\omega\rho\tau\theta u_1 u_2 + A\beta\delta\eta\gamma\rho\tau^2\theta u_2^2 - A\beta\delta\eta\mu^2\omega\tau\theta u_1 u_2 - A\beta\delta\eta\mu\omega\rho\tau\theta u_1 u_2$$

$$-2A\beta\delta\mu n\omega\rho\tau\theta^2 u_1 u_2 + A\beta\delta\mu n\rho\tau^2\theta^2 u_2^2 - 2\alpha\delta\eta\gamma\mu\omega\tau^2\theta u_1 u_2^2 - 2\alpha\delta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2 - 2\alpha\delta\gamma\mu\omega\rho\tau^2\theta u_1 u_2^2$$

$$-2\alpha\eta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2 - 2\alpha\gamma\mu^3\omega\tau^2\theta u_1 u_2^2 - 2\alpha\gamma\mu^2\omega\rho\tau^2\theta u_1 u_2^2 - 2\delta\eta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2 - 3\delta\eta\gamma\mu\omega\tau^2\theta^2 u_1 u_2^2$$

$$-\delta\eta\mu^2\omega\tau^2\theta^2 u_1 u_2^2 - 2\delta\gamma\mu^3\omega\tau^2\theta u_1 u_2^2 - 2\delta\gamma\mu^2\omega\rho\tau^2\theta u_1 u_2^2 - 3\delta\gamma\mu^2\omega\tau^2\theta^2 u_1 u_2^2 - 3\delta\gamma\mu\omega\rho\tau^2\theta^2 u_1 u_2^2 - \delta\mu^3\omega\tau^2\theta^2 u_1$$

$$u_2^2 - \delta\mu^2\omega\rho\tau^2\theta^2 u_1 u_2^2 - 2\eta\gamma\mu^3\omega\tau^2\theta u_1 u_2^2 - 3\eta\gamma\mu^2\omega\tau^2\theta^2 u_1 u_2^2 - \eta\mu^3\omega\tau^2\theta^2 u_1 u_2^2 - 2\gamma\mu^4\omega\tau^2\theta u_1 u_2^2 - 2\gamma\mu^3\omega\rho\tau^2\theta u_1 u_2^2$$

$$-3\gamma\mu^3\omega\tau^2\theta^2 u_1 u_2^2 - 3\gamma\mu^2\omega\rho\tau^2\theta^2 u_1 u_2^2 - \mu^4\omega\tau^2\theta^2 u_1 u_2^2 - \mu^3\omega\rho\tau^2\theta^2 u_1 u_2^2 - A\alpha\beta\delta\eta\gamma\mu\omega\tau u_1 u_2 - A\alpha\beta\delta\eta\gamma\omega\rho\tau u_1 u_2$$

$$-A\alpha\beta\delta\gamma\mu^2\omega\tau u_1 u_2 - A\alpha\beta\delta\gamma\mu\omega\rho\tau u_1 u_2 - A\beta\delta\eta\gamma\mu^2\omega\tau u_1 u_2 - A\beta\delta\eta\gamma\mu\omega\rho\tau u_1 u_2 - 2A\beta\delta\eta\gamma\mu\omega\tau\theta u_1 u_2$$

$$+A\beta\delta\eta\gamma\mu\tau^2\theta u_2^2 - 2A\beta\delta\eta\gamma\omega\rho\tau\theta u_1 u_2 + A\beta\delta\eta\gamma\rho\tau^2\theta u_2^2 - A\beta\delta\eta\mu^2\omega\tau\theta u_1 u_2 - A\beta\delta\eta\mu\omega\rho\tau\theta u_1 u_2$$

$$+A\beta\delta\gamma\mu\rho\tau^2\theta u_2^2 - A\beta\delta\mu^3\omega\tau\theta u_1 u_2 - A\beta\delta\mu^2\omega\rho\tau\theta u_1 u_2 - 2\alpha\delta\eta\gamma\mu^2\tau^2\theta u_2^2 - 2\alpha\delta\eta\gamma\mu\rho\tau^2\theta u_2^2 - 2\alpha\delta\gamma\mu^3\tau^2\theta u_2^2$$

$$-2\alpha\delta\gamma\mu^2\rho\tau^2\theta u_2^2 - 2\alpha\eta\gamma\mu^3\tau^2\theta u_2^2 - 2\alpha\eta\gamma\mu^2\rho\tau^2\theta u_2^2 - 2\alpha\gamma\mu^4\tau^2\theta u_2^2 - 2\alpha\gamma\mu^3\rho\tau^2\theta u_2^2 - 2\delta\eta\gamma\mu^3\tau^2\theta u_2^2$$

$$-2\delta\eta\gamma\mu^2\rho\tau^2\theta u_2^2 - 3\delta\eta\gamma\mu^2\tau^2\theta^2 u_2^2 - 3\delta\eta\gamma\mu\rho\tau^2\theta^2 u_2^2 - \delta\eta\mu^3\tau^2\theta^2 u_2^2 - \delta\eta\mu^2\rho\tau^2\theta^2 u_2^2 - 2\delta\gamma\mu^4\tau^2\theta u_2^2 - 2\delta\gamma\mu^3\rho\tau^2\theta$$

$$u_2^2 - 3\delta\gamma\mu^3\tau^2\theta^2 u_2^2 - 3\delta\gamma\mu^2\rho\tau^2\theta^2 u_2^2 - \delta\mu^4\tau^2\theta^2 u_2^2 - \delta\mu^3\rho\tau^2\theta^2 u_2^2 - 2\eta\gamma\mu^4\tau^2\theta u_2^2 - 2\eta\gamma\mu^3\rho\tau^2\theta u_2^2 - 3\eta\gamma\mu^3\tau^2\theta^2 u_2^2$$

$$-3\eta\gamma\mu^2\rho\tau^2\theta^2 u_2^2 - \eta\mu^4\tau^2\theta^2 u_2^2 - \eta\mu^3\rho\tau^2\theta^2 u_2^2 - 2\gamma\mu^5\tau^2\theta u_2^2 - 2\gamma\mu^4\rho\tau^2\theta u_2^2 - 3\gamma\mu^4\tau^2\theta^2 u_2^2 - 3\gamma\mu^3\rho\tau^2\theta^2 u_2^2 - \mu^5\tau^2\theta^2$$

$$u_2^2 - \mu^4\rho\tau^2\theta^2 u_2^2 - A\alpha^2\beta\delta\eta\mu n\omega u_1 - A\alpha^2\beta\delta\eta n\omega\rho u_1 - A\alpha^2\beta\delta\mu^2 n\omega u_1 - A\alpha^2\beta\delta\mu n\omega\rho u_1 + A\alpha\beta\delta\eta\gamma\mu n\omega u_1$$

$$-A\alpha\beta\delta\eta\gamma\mu n\tau u_2 + A\alpha\beta\delta\eta\gamma n\omega\rho u_1 - A\alpha\beta\delta\eta\gamma n\rho\tau u_2 - A\alpha\beta\delta\eta\mu^2 n\omega u_1 - A\alpha\beta\delta\eta\mu n\omega\rho u_1$$

$$-2A\alpha\beta\delta\eta\mu n\omega\theta u_1 + 2A\alpha\beta\delta\eta\mu n\tau\theta u_2 - 2A\alpha\beta\delta\eta n\omega\rho\theta u_1 + 2A\alpha\beta\delta\eta n\rho\tau\theta u_2 + A\alpha\beta\delta\gamma\mu^2 n\omega u_1$$

$$-A\alpha\beta\delta\gamma\mu^2 n\tau u_2 + A\alpha\beta\delta\gamma\mu n\omega\rho u_1 - A\alpha\beta\delta\gamma\mu n\rho\tau u_2 - A\alpha\beta\delta\mu^3 n\omega u_1 - A\alpha\beta\delta\mu^2 n\omega\rho u_1 - 2A\alpha\beta\delta\mu^2 n\omega\theta u_1$$

$$+2A\alpha\beta\delta\mu^2 n\tau\theta u_2 - 2A\alpha\beta\delta\mu n\omega\rho\theta u_1 + 2A\alpha\beta\delta\mu n\rho\tau\theta u_2 + A\beta\delta\eta\gamma\mu^2 n\omega u_1 - A\beta\delta\eta\gamma\mu^2 n\tau u_2 + A\beta\delta\eta\gamma\mu n\omega\rho u_1$$

$$+A\beta\delta\eta\gamma\mu n\omega\theta u_1 - A\beta\delta\eta\gamma\mu n\rho\tau u_2 - 2A\beta\delta\eta\gamma\mu n\tau\theta u_2 + A\beta\delta\eta\gamma n\omega\rho\theta u_1 - 2A\beta\delta\eta\gamma n\rho\tau\theta u_2 - A\beta\delta\eta\mu^2 n\omega\theta u_1$$

$$+A\beta\delta\eta\mu^2 n\tau\theta u_2 - A\beta\delta\eta\mu n\omega\rho\theta u_1 - A\beta\delta\eta\mu n\omega\theta^2 u_1 + A\beta\delta\eta\mu n\rho\tau\theta u_2 + 2A\beta\delta\eta\mu n\tau\theta^2 u_2 - A\beta\delta\eta n\omega\rho\theta^2 u_1$$

$$+2A\beta\delta\eta n\rho\tau\theta^2 u_2 + A\beta\delta\gamma\mu^3 n\omega u_1 - A\beta\delta\gamma\mu^3 n\tau u_2 + A\beta\delta\gamma\mu^2 n\omega\rho u_1 + A\beta\delta\gamma\mu^2 n\omega\theta u_1 - A\beta\delta\gamma\mu^2 n\rho\tau u_2$$

$$-\mu^4\rho\theta\big)\delta\big), S = \big(\delta\gamma\tau^2\theta u_2^2 + \gamma\mu\tau^2\theta u_2^2 + \alpha\delta\gamma\tau u_2 + \alpha\gamma\mu\tau u_2 + \delta\gamma\mu\tau u_2 + 2\delta\gamma\tau\theta u_2 + \delta\mu\tau\theta u_2 + \gamma\mu^2\tau u_2$$

$$+2\gamma\mu\tau\theta u_2 + \mu^2\tau\theta u_2 + \alpha\delta\gamma + \alpha\delta\mu + \alpha\gamma\mu + \alpha\mu^2 + \delta\gamma\mu + \delta\gamma\theta + \delta\mu^2 + \delta\mu\theta + \gamma\mu^2 + \gamma\mu\theta + \mu^3 + \mu^2\theta\big)\Big/$$

$$\big(\beta\delta\big(\gamma n\omega\tau u_1 u_2 - n\omega\tau\theta u_1 u_2 - \gamma\omega\tau u_1 u_2 - \alpha n\omega u_1 + \gamma n\omega u_1 - \gamma n\tau u_2 - n\omega\theta u_1 + n\tau\theta u_2 - \gamma\omega u_1 + \gamma\tau u_2 - \mu\omega u_1$$

$$+\alpha n - \gamma n + n\theta + \gamma + \mu\big)\big), I_\alpha = -\big(n\big(A\beta\delta\eta\gamma\mu n\omega\tau^2\theta u_1 u_2^2 + A\beta\delta\eta\gamma n\omega\rho\tau^2\theta u_1 u_2^2 - A\beta\delta\eta\mu n\omega\tau^2\theta^2 u_1 u_2^2$$

$$-A\beta\delta\eta n\omega\rho\tau^2\theta^2 u_1 u_2^2 + A\beta\delta\gamma\mu^2 n\omega\tau^2\theta u_1 u_2^2 + A\beta\delta\gamma\mu n\omega\rho\tau^2\theta u_1 u_2^2 - A\beta\delta\mu^2 n\omega\tau^2\theta^2 u_1 u_2^2 - A\beta\delta\mu n\omega\rho\tau^2\theta^2 u_1 u_2^2$$

$$-\delta\eta\gamma\mu\omega\tau^3\theta^2 u_1 u_2^3 - \delta\gamma\mu^2\omega\tau^3\theta^2 u_1 u_2^3 - \delta\gamma\mu\omega\rho\tau^3\theta^2 u_1 u_2^3 - \eta\gamma\mu^2\omega\tau^3\theta^2 u_1 u_2^3 - \gamma\mu^3\omega\tau^3\theta^2 u_1 u_2^3 - \gamma\mu^2\omega\rho\tau^3\theta^2 u_1 u_2^3$$

$$-A\beta\delta\eta\gamma\mu\omega\tau^2\theta u_1 u_2^2 - A\beta\delta\eta\gamma\omega\rho\tau^2\theta u_1 u_2^2 - A\beta\delta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2 - A\beta\delta\gamma\mu\omega\rho\tau^2\theta u_1 u_2^2 - \delta\eta\gamma\mu^2\tau^3\theta^2 u_2^3$$

$$-\delta\eta\gamma\mu\rho\tau^3\theta^2 u_2^3 - \delta\gamma\mu^3\tau^3\theta^2 u_2^3 - \delta\gamma\mu^2\rho\tau^3\theta^2 u_2^3 - \eta\gamma\mu^3\tau^3\theta^2 u_2^3 - \eta\gamma\mu^2\rho\tau^3\theta^2 u_2^3 - \gamma\mu^4\tau^3\theta^2 u_2^3 - \gamma\mu^3\rho\tau^3\theta^2 u_2^3$$

$$+A\alpha\beta\delta\eta\gamma\mu n\omega\tau u_1 u_2 + A\alpha\beta\delta\eta\gamma n\omega\rho\tau u_1 u_2 - 2A\alpha\beta\delta\eta\mu n\omega\tau\theta u_1 u_2 - 2A\alpha\beta\delta\eta n\omega\rho\tau\theta u_1 u_2$$

$$+A\alpha\beta\delta\gamma\mu^2 n\omega\tau u_1 u_2 + A\alpha\beta\delta\gamma\mu n\omega\rho\tau u_1 u_2 - 2A\alpha\beta\delta\mu^2 n\omega\tau\theta u_1 u_2 - 2A\alpha\beta\delta\mu n\omega\rho\tau\theta u_1 u_2 + A\beta\delta\eta\gamma\mu^2 n\omega\tau u_1 u_2$$

$$+A\beta\delta\eta\gamma\mu n\omega\rho\tau u_1 u_2 + 2A\beta\delta\eta\gamma\mu n\omega\tau\theta u_1 u_2 - A\beta\delta\eta\gamma\mu n\tau^2\theta u_2^2 + 2A\beta\delta\eta\gamma n\omega\rho\tau\theta u_1 u_2 - A\beta\delta\eta\gamma n\rho\tau^2\theta u_2^2$$

$$-A\beta\delta\eta\mu^2 n\omega\tau\theta u_1 u_2 - A\beta\delta\eta\mu n\omega\rho\tau\theta u_1 u_2 - 2A\beta\delta\eta\mu n\omega\tau\theta^2 u_1 u_2 + A\beta\delta\eta\mu n\tau^2\theta^2 u_2^2 - 2A\beta\delta\eta n\omega\rho\tau\theta^2 u_1 u_2$$

$$+A\beta\delta\eta n\rho\tau^2\theta^2 u_2^2 + A\beta\delta\gamma\mu^3 n\omega\tau u_1 u_2 + A\beta\delta\gamma\mu^2 n\omega\rho\tau u_1 u_2 + 2A\beta\delta\gamma\mu^2 n\omega\tau\theta u_1 u_2 - A\beta\delta\gamma\mu^2 n\tau^2\theta u_2^2$$

$$+2A\beta\delta\gamma\mu n\omega\rho\tau\theta u_1 u_2 - A\beta\delta\gamma\mu n\rho\tau^2\theta u_2^2 - A\beta\delta\mu^3 n\omega\tau\theta u_1 u_2 - A\beta\delta\mu^2 n\omega\rho\tau\theta u_1 u_2 - 2A\beta\delta\mu^2 n\omega\tau\theta^2 u_1 u_2$$

$$+A\beta\delta\mu^2 n\tau^2\theta^2 u_2^2 - 2A\beta\delta\mu n\omega\rho\tau\theta^2 u_1 u_2 + A\beta\delta\mu n\rho\tau^2\theta^2 u_2^2 - 2\alpha\delta\eta\gamma\mu\omega\tau^2\theta u_1 u_2^2 - 2\alpha\delta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2$$

$$-2\alpha\delta\gamma\mu\omega\rho\tau^2\theta u_1 u_2^2 - 2\alpha\eta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2 - 2\alpha\gamma\mu^3\omega\tau^2\theta u_1 u_2^2 - 2\alpha\gamma\mu^2\omega\rho\tau^2\theta u_1 u_2^2 - 2\delta\eta\gamma\mu^2\omega\tau^2\theta u_1 u_2^2$$

$$-\delta\mu^5\rho - 2\delta\mu^5\theta - 2\delta\mu^4\rho\theta - \delta\mu^4\theta^2 - \delta\mu^3\rho\theta^2 - \eta\gamma\mu^5 - \eta\gamma\mu^4\rho - 2\eta\gamma\mu^4\theta - 2\eta\gamma\mu^3\rho\theta - \eta\gamma\mu^3\theta^2 - \eta\gamma\mu^2\rho\theta^2$$

$$-\eta\mu^6 - \eta\mu^5\rho - 2\eta\mu^5\theta - 2\eta\mu^4\rho\theta - \eta\mu^4\theta^2 - \eta\mu^3\rho\theta^2 - \gamma\mu^6 - \gamma\mu^5\rho - 2\gamma\mu^5\theta - 2\gamma\mu^4\rho\theta - \gamma\mu^4\theta^2 - \gamma\mu^3\rho\theta^2 - \mu^7$$

$$-\mu^6\rho - 2\mu^6\theta - 2\mu^5\rho\theta - \mu^5\theta^2 - \mu^4\rho\theta^2\big)\big)\Big/\big(\beta\big(\delta\eta\gamma^2 m\mu n^2\omega\tau^3\theta u_1 u_2^3 - \delta\eta\gamma m\mu n^2\omega\tau^3\theta^2 u_1 u_2^3$$

$$-2\delta\eta\gamma^2 m\mu n\omega\tau^3\theta u_1 u_2^3 + \delta\eta\gamma m\mu n\omega\tau^3\theta^2 u_1 u_2^3 - \alpha\delta\eta\gamma m\mu n^2\omega\tau^2\theta u_1 u_2^2 + 3\delta\eta\gamma^2 m\mu n^2\omega\tau^2\theta u_1 u_2^2 - \delta\eta\gamma^2 m\mu n^2\tau^3\theta$$

$$u_2^3 + \delta\eta\gamma^2 m\mu\omega\tau^3\theta u_1 u_2^3 + \delta\eta\gamma m\mu^2 n^2\omega\tau^2\theta u_1 u_2^2 - 3\delta\eta\gamma m\mu n^2\omega\tau^2\theta^2 u_1 u_2^2 + \delta\eta\gamma m\mu n^2\tau^3\theta^2 u_2^3 - \delta\eta m\mu^2 n^2\omega\tau^2\theta^2 u_1 u_2^2$$

$$-\delta\gamma^2\mu^2 n\omega\tau^3\theta u_1 u_2^3 - \delta\gamma^2\mu n\omega\rho\tau^3\theta u_1 u_2^3 + \delta\gamma\mu^2 n\omega\tau^3\theta^2 u_1 u_2^3 + \delta\gamma\mu n\omega\rho\tau^3\theta^2 u_1 u_2^3 - \eta\gamma^2\mu^2 n\omega\tau^3\theta u_1 u_2^3$$

$$-\eta\gamma^2\mu n\omega\rho\tau^3\theta u_1 u_2^3 + \eta\gamma\mu^2 n\omega\tau^3\theta^2 u_1 u_2^3 + \eta\gamma\mu n\omega\rho\tau^3\theta^2 u_1 u_2^3 - \gamma^2\mu^3 n\omega\tau^3\theta u_1 u_2^3 - \gamma^2\mu^2 n\omega\rho\tau^3\theta u_1 u_2^3$$

$$+\gamma\mu^3 n\omega\tau^3\theta^2 u_1 u_2^3 + \gamma\mu^2 n\omega\rho\tau^3\theta^2 u_1 u_2^3 + \alpha\delta\eta\gamma^2\mu n^2\omega\tau^2 u_1 u_2^2 + \alpha\delta\eta\gamma^2 n^2\omega\rho\tau^2 u_1 u_2^2 + \alpha\delta\eta\gamma m\mu n\omega\tau^2\theta u_1 u_2^2$$

$$
\begin{aligned}
&-\alpha\delta\gamma^2\mu\rho-2\alpha\delta\gamma\mu^3-2\alpha\delta\gamma\mu^2\rho-\alpha\delta\mu^4-\alpha\delta\mu^3\rho-\alpha\eta\gamma^2\mu^2-\alpha\eta\gamma^2\mu\rho-2\alpha\eta\gamma\mu^3-2\alpha\eta\gamma\mu^2\rho-\alpha\eta\mu^4\\
&-\alpha\eta\mu^3\rho-\alpha\gamma^2\mu^3-\alpha\gamma^2\mu^2\rho-2\alpha\gamma\mu^4-2\alpha\gamma\mu^3\rho-\alpha\mu^5-\alpha\mu^4\rho-\delta\eta\gamma^2\mu^2-\delta\eta\gamma^2\mu\rho-2\delta\eta\gamma\mu^3-2\delta\eta\gamma\mu^2\rho\\
&-\delta\eta\mu^4-\delta\eta\mu^3\rho-\delta\gamma^2\mu^3-\delta\gamma^2\mu^2\rho-\delta\gamma^2\mu^2\theta-\delta\gamma^2\mu\rho\theta-2\delta\gamma\mu^4-2\delta\gamma\mu^3\rho-2\delta\gamma\mu^3\theta-2\delta\gamma\mu^2\rho\theta-\delta\mu^5-\delta\mu^4\rho\\
&-\delta\mu^4\theta-\delta\mu^3\rho\theta-\eta\gamma^2\mu^3-\eta\gamma^2\mu^2\rho-\eta\gamma^2\mu^2\theta-\eta\gamma^2\mu\rho\theta-2\eta\gamma\mu^4-2\eta\gamma\mu^3\rho-2\eta\gamma\mu^3\theta-2\eta\gamma\mu^2\rho\theta-\eta\mu^5\\
&-\eta\mu^4\rho-\eta\mu^4\theta-\eta\mu^3\rho\theta-\gamma^2\mu^4-\gamma^2\mu^3\rho-\gamma^2\mu^3\theta-\gamma^2\mu^2\rho\theta-2\gamma\mu^5-2\gamma\mu^4\rho-2\gamma\mu^4\theta-2\gamma\mu^3\rho\theta-\mu^6-\mu^5\rho-\mu^5\theta\\
&-\mu^4\rho\theta\Big)\Big),\ I_z=\Big(\big(\gamma n\tau u_2-\gamma\tau u_2+\gamma n+\mu n-\gamma-\mu\big)\Big(A\beta\delta\eta\gamma\mu n\omega\tau u_1u_2+A\beta\delta\eta\gamma n\omega\rho\tau u_1u_2\\
&-A\beta\delta\eta\mu n\omega\tau\theta u_1u_2-A\beta\delta\eta n\omega\rho\tau\theta u_1u_2+A\beta\delta\gamma\mu^2n\omega\tau u_1u_2+A\beta\delta\gamma\mu n\omega\rho\tau u_1u_2-A\beta\delta\mu^2n\omega\tau\theta u_1u_2\\
&-A\beta\delta\mu n\omega\rho\tau\theta u_1u_2-\delta\eta\gamma\mu\omega\tau^2\theta u_1u_2^2-\delta\gamma\mu^2\omega\tau^2\theta u_1u_2^2-\delta\gamma\mu\omega\rho\tau^2\theta u_1u_2^2-\eta\gamma\mu^2\omega\tau^2\theta u_1u_2^2-\gamma\mu^3\omega\tau^2\theta u_1u_2^2\\
&-\gamma\mu^2\omega\rho\tau^2\theta u_1u_2^2-A\beta\delta\eta\gamma\mu\omega\tau u_1u_2-A\beta\delta\eta\gamma\omega\rho\tau u_1u_2-A\beta\delta\gamma\mu^2\omega\tau u_1u_2-A\beta\delta\gamma\mu\omega\rho\tau u_1u_2-\delta\eta\gamma\mu^2\tau^2\theta u_2^2\\
&-\delta\eta\gamma\mu\rho\tau^2\theta u_2^2-\delta\gamma\mu^3\tau^2\theta u_2^2-\delta\gamma\mu^2\rho\tau^2\theta u_2^2-\eta\gamma\mu^3\tau^2\theta u_2^2-\eta\gamma\mu^2\rho\tau^2\theta u_2^2-\gamma\mu^4\tau^2\theta u_2^2-\gamma\mu^3\rho\tau^2\theta u_2^2\\
&-A\alpha\beta\delta\eta\mu n\omega u_1-A\alpha\beta\delta\eta n\omega\rho u_1-A\alpha\beta\delta\mu^2n\omega u_1-A\alpha\beta\delta\mu n\omega\rho u_1+A\beta\delta\eta\gamma\mu n\omega u_1-A\beta\delta\eta\gamma\mu n\tau u_2\\
&+A\beta\delta\eta\gamma n\omega\rho u_1-A\beta\delta\eta\gamma n\rho\tau u_2-A\beta\delta\eta\mu n\omega\theta u_1+A\beta\delta\eta\mu n\tau\theta u_2-A\beta\delta\eta n\omega\rho\theta u_1+A\beta\delta\eta n\rho\tau\theta u_2\\
&+A\beta\delta\gamma\mu^2n\omega u_1-A\beta\delta\gamma\mu^2n\tau u_2+A\beta\delta\gamma\mu n\omega\rho u_1-A\beta\delta\gamma\mu n\rho\tau u_2-A\beta\delta\mu^2n\omega\theta u_1+A\beta\delta\mu^2n\tau\theta u_2\\
&-A\beta\delta\mu n\omega\rho\theta u_1+A\beta\delta\mu n\rho\tau\theta u_2-\alpha\delta\eta\gamma\mu\omega\tau u_1u_2-\alpha\delta\gamma\mu^2\omega\tau u_1u_2-\alpha\delta\gamma\mu\omega\rho\tau u_1u_2-\alpha\eta\gamma\mu^2\omega\tau u_1u_2\\
&-\alpha\gamma\mu^3\omega\tau u_1u_2-\alpha\gamma\mu^2\omega\rho\tau u_1u_2-\delta\eta\gamma\mu^2\omega\tau u_1u_2-2\delta\eta\gamma\mu\omega\tau\theta u_1u_2-\delta\eta\mu^2\omega\tau\theta u_1u_2-\delta\gamma\mu^3\omega\tau u_1u_2\\
&-\delta\gamma\mu^2\omega\rho\tau u_1u_2-2\delta\gamma\mu^2\omega\tau\theta u_1u_2-2\delta\gamma\mu\omega\rho\tau\theta u_1u_2-\delta\mu^3\omega\tau\theta u_1u_2-\delta\mu^2\omega\rho\tau\theta u_1u_2-\eta\gamma\mu^3\omega\tau u_1u_2\\
&-\eta\gamma\mu^3\rho-\eta\gamma\mu^3\theta-\eta\gamma\mu^2\rho\theta-\eta\mu^5-\eta\mu^4\rho-\eta\mu^4\theta-\eta\mu^3\rho\theta-\gamma\mu^5-\gamma\mu^4\rho-\gamma\mu^4\theta-\gamma\mu^3\rho\theta-\mu^6-\mu^5\rho-\mu^5\theta\\
&-\mu^4\rho\theta\Big)\Big)\Big/\Big(\beta\big(\delta\eta\gamma^2m\mu n^2\omega\tau^3\theta u_1u_2^3-\delta\eta\gamma m\mu n^2\omega\tau^3\theta^2u_1u_2^3-2\delta\eta\gamma^2m\mu n\omega\tau^3\theta u_1u_2^3+\delta\eta\gamma m\mu n\omega\tau^3\theta^2u_1u_2^3\\
&-\alpha\delta\eta\gamma m\mu n^2\omega\tau^2\theta u_1u_2^2+3\delta\eta\gamma^2m\mu n^2\omega\tau^2\theta u_1u_2^2-\delta\eta\gamma^2m\mu n^2\tau^3\theta u_2^3+\delta\eta\gamma^2m\mu\omega\tau^3\theta u_1u_2^3+\delta\eta\gamma m\mu^2n^2\omega\tau^2\theta u_1u_2^2\\
&-3\delta\eta\gamma m\mu n^2\omega\tau^2\theta^2u_1u_2^2+\delta\eta\gamma m\mu n^2\tau^3\theta^2u_2^3-\delta\eta m\mu^2n^2\omega\tau^2\theta^2u_1u_2^2-\delta\gamma^2\mu^2n\omega\tau^3\theta u_1u_2^3-\delta\gamma^2\mu n\omega\rho\tau^3\theta u_1u_2^3\\
&+\delta\gamma\mu^2n\omega\tau^3\theta^2u_1u_2^3+\delta\gamma\mu n\omega\rho\tau^3\theta^2u_1u_2^3-\eta\gamma^2\mu^2n\omega\tau^3\theta u_1u_2^3-\eta\gamma^2\mu n\omega\rho\tau^3\theta u_1u_2^3+\eta\gamma\mu^2n\omega\tau^3\theta^2u_1u_2^3\\
&+\eta\gamma\mu n\omega\rho\tau^3\theta^2u_1u_2^3-\gamma^2\mu^3n\omega\tau^3\theta u_1u_2^3-\gamma^2\mu^2n\omega\rho\tau^3\theta u_1u_2^3+\gamma\mu^3n\omega\tau^3\theta^2u_1u_2^3+\gamma\mu^2n\omega\rho\tau^3\theta^2u_1u_2^3\\
&+\alpha\delta\eta\gamma^2\mu n^2\omega\tau^2u_1u_2^2+\alpha\delta\eta\gamma^2n^2\omega\rho\tau^2u_1u_2^2+\alpha\delta\eta\gamma m\mu n\omega\tau^2\theta u_1u_2^2-\alpha\delta\eta\gamma\mu n^2\omega\tau^2\theta u_1u_2^2-\alpha\delta\eta\gamma n^2\omega\rho\tau^2\theta u_1u_2^2
\end{aligned}
$$

$$-\gamma^2\mu^3 n\omega\theta u_1+2\gamma^2\mu^3 n\rho\tau u_2+3\gamma^2\mu^3 n\tau\theta u_2-\gamma^2\mu^2 n\omega\rho\theta u_1+3\gamma^2\mu^2 n\rho\tau\theta u_2-\gamma\mu^5 n\omega u_1+\gamma\mu^5 n\tau u_2-\gamma\mu^4 n\omega\rho u_1$$

$$+\gamma\mu^4 n\rho\tau u_2+\gamma\mu^3 n\omega\theta^2 u_1-3\gamma\mu^3 n\tau\theta^2 u_2+\gamma\mu^2 n\omega\rho\theta^2 u_1-3\gamma\mu^2 n\rho\tau\theta^2 u_2+\mu^5 n\omega\theta u_1-\mu^5 n\tau\theta u_2+\mu^4 n\omega\rho\theta u_1$$

$$+\mu^4 n\omega\theta^2 u_1-\mu^4 n\rho\tau\theta u_2-2\mu^4 n\tau\theta^2 u_2+\mu^3 n\omega\rho\theta^2 u_1-2\mu^3 n\rho\tau\theta^2 u_2+\alpha^2\delta\eta\gamma\mu n^2+\alpha^2\delta\eta\gamma n^2\rho-\alpha\delta\eta\gamma^2\mu n^2$$

$$+\alpha\delta\eta\gamma^2\mu\omega u_1-2\alpha\delta\eta\gamma^2\mu\tau u_2-\alpha\delta\eta\gamma^2 n^2\rho+\alpha\delta\eta\gamma^2\omega\rho u_1-2\alpha\delta\eta\gamma^2\rho\tau u_2-\alpha\delta\eta\gamma m\mu n\theta+\alpha\delta\eta\gamma\mu^2 n^2$$

$$+2\alpha\delta\eta\gamma\mu^2\omega u_1-2\alpha\delta\eta\gamma\mu^2\tau u_2+\alpha\delta\eta\gamma\mu n^2\rho+\alpha\delta\eta\gamma\mu n^2\theta+2\alpha\delta\eta\gamma\mu\omega\rho u_1-2\alpha\delta\eta\gamma\mu\rho\tau u_2+\alpha\delta\eta\gamma n^2\rho\theta$$

$$-\alpha\delta\eta m\mu^2 n\theta+\alpha\delta\eta\mu^3\omega u_1-\alpha\delta\eta\mu^2 n^2\theta+\alpha\delta\eta\mu^2\omega\rho u_1-\alpha\delta\eta\mu n^2\rho\theta+\alpha\delta\gamma^2\mu^2\omega u_1-2\alpha\delta\gamma^2\mu^2\tau u_2$$

$$+\alpha\delta\gamma^2\mu\omega\rho u_1-2\alpha\delta\gamma^2\mu\rho\tau u_2+2\alpha\delta\gamma\mu^3\omega u_1-2\alpha\delta\gamma\mu^3\tau u_2+2\alpha\delta\gamma\mu^2\omega\rho u_1-2\alpha\delta\gamma\mu^2\rho\tau u_2+\alpha\delta\mu^4\omega u_1$$

$$+\alpha\delta\mu^3\omega\rho u_1+\alpha\eta\gamma^2\mu^2\omega u_1-2\alpha\eta\gamma^2\mu^2\tau u_2+\alpha\eta\gamma^2\mu\omega\rho u_1-2\alpha\eta\gamma^2\mu\rho\tau u_2+2\alpha\eta\gamma\mu^3\omega u_1-2\alpha\eta\gamma\mu^3\tau u_2$$

$$+\eta\gamma^2\mu^2\omega\theta u_1-2\eta\gamma^2\mu^2\rho\tau u_2-3\eta\gamma^2\mu^2\tau\theta u_2+\eta\gamma^2\mu\omega\rho\theta u_1-3\eta\gamma^2\mu\rho\tau\theta u_2+2\eta\gamma\mu^4\omega u_1-2\eta\gamma\mu^4\tau u_2$$

$$+2\eta\gamma\mu^3\omega\rho u_1+2\eta\gamma\mu^3\omega\theta u_1-2\eta\gamma\mu^3\rho\tau u_2-4\eta\gamma\mu^3\tau\theta u_2+2\eta\gamma\mu^2\omega\rho\theta u_1-4\eta\gamma\mu^2\rho\tau\theta u_2+\eta\mu^5\omega u_1+\eta\mu^4\omega\rho u_1$$

$$+\eta\mu^4\omega\theta u_1-\eta\mu^4\tau\theta u_2+\eta\mu^3\omega\rho\theta u_1-\eta\mu^3\rho\tau\theta u_2+\gamma^2\mu^4\omega u_1-2\gamma^2\mu^4\tau u_2+\gamma^2\mu^3\omega\rho u_1+\gamma^2\mu^3\omega\theta u_1-2\gamma^2\mu^3\rho\tau u_2$$

$$-3\gamma^2\mu^3\tau\theta u_2+\gamma^2\mu^2\omega\rho\theta u_1-3\gamma^2\mu^2\rho\tau\theta u_2+2\gamma\mu^5\omega u_1-2\gamma\mu^5\tau u_2+2\gamma\mu^4\omega\rho u_1+2\gamma\mu^4\omega\theta u_1-2\gamma\mu^4\rho\tau u_2$$

$$-4\gamma\mu^4\tau\theta u_2+2\gamma\mu^3\omega\rho\theta u_1-4\gamma\mu^3\rho\tau\theta u_2+\mu^6\omega u_1+\mu^5\omega\rho u_1+\mu^5\omega\theta u_1-\mu^5\tau\theta u_2+\mu^4\omega\rho\theta u_1-\mu^4\rho\tau\theta u_2$$

$$-\alpha^2\delta\eta\gamma\mu n-\alpha^2\delta\eta\gamma n\rho-\alpha^2\delta\eta\mu^2 n-\alpha^2\delta\eta\mu n\rho-\alpha^2\delta\gamma\mu^2 n-\alpha^2\delta\gamma\mu n\rho-\alpha^2\delta\mu^3 n-\alpha^2\delta\mu^2 n\rho-\alpha^2\eta\gamma\mu^2 n$$

$$-\alpha^2\eta\gamma\mu n\rho-\alpha^2\eta\mu^3 n-\alpha^2\eta\mu^2 n\rho-\alpha^2\gamma\mu^3 n-\alpha^2\gamma\mu^2 n\rho-\alpha^2\mu^4 n-\alpha^2\mu^3 n\rho+2\alpha\delta\eta\gamma^2\mu n+2\alpha\delta\eta\gamma^2 n\rho$$

$$+\alpha\delta\gamma^2\mu n\rho-2\alpha\delta\gamma\mu^2 n\theta-2\alpha\delta\gamma\mu n\rho\theta-\alpha\delta\mu^4 n-\alpha\delta\mu^3 n\rho-2\alpha\delta\mu^3 n\theta-2\alpha\delta\mu^2 n\rho\theta+\alpha\eta\gamma^2\mu^2 n+\alpha\eta\gamma^2\mu n\rho$$

$$-2\alpha\eta\gamma\mu^2 n\theta-2\alpha\eta\gamma\mu n\rho\theta-\alpha\eta\mu^4 n-\alpha\eta\mu^3 n\rho-2\alpha\eta\mu^3 n\theta-2\alpha\eta\mu^2 n\rho\theta+\alpha\gamma^2\mu^3 n+\alpha\gamma^2\mu^2 n\rho-2\alpha\gamma\mu^3 n\theta$$

$$-2\alpha\gamma\mu^2 n\rho\theta-\alpha\mu^5 n-\alpha\mu^4 n\rho-2\alpha\mu^4 n\theta-2\alpha\mu^3 n\rho\theta-\delta\eta\gamma^2 m\mu\theta+2\delta\eta\gamma^2\mu^2 n+2\delta\eta\gamma^2\mu n\rho-2\delta\eta\gamma m\mu^2\theta$$

$$+2\delta\eta\gamma\mu^3 n+2\delta\eta\gamma\mu^2 n\rho-2\delta\eta\gamma\mu^2 n\theta-2\delta\eta\gamma\mu n\rho\theta-\delta\eta m\mu^3\theta-2\delta\eta\mu^3 n\theta-2\delta\eta\mu^2 n\rho\theta+\delta\gamma^2\mu^3 n+\delta\gamma^2\mu^2 n\rho$$

$$+\delta\gamma^2\mu^2 n\theta+\delta\gamma^2\mu n\rho\theta+\delta\gamma\mu^4 n+\delta\gamma\mu^3 n\rho-\delta\gamma\mu^2 n\theta^2-\delta\gamma\mu n\rho\theta^2-\delta\mu^4 n\theta-\delta\mu^3 n\rho\theta-\delta\mu^3 n\theta^2-\delta\mu^2 n\rho\theta^2$$

$$+\eta\gamma^2\mu^3 n+\eta\gamma^2\mu^2 n\rho+\eta\gamma^2\mu^2 n\theta+\eta\gamma^2\mu n\rho\theta+\eta\gamma\mu^4 n+\eta\gamma\mu^3 n\rho-\eta\gamma\mu^2 n\theta^2-\eta\gamma\mu n\rho\theta^2-\eta\mu^4 n\theta-\eta\mu^3 n\rho\theta$$

$$-\eta\mu^3 n\theta^2-\eta\mu^2 n\rho\theta^2+\gamma^2\mu^4 n+\gamma^2\mu^3 n\rho+\gamma^2\mu^3 n\theta+\gamma^2\mu^2 n\rho\theta+\gamma\mu^5 n+\gamma\mu^4 n\rho-\gamma\mu^3 n\theta^2-\gamma\mu^2 n\rho\theta^2-\mu^5 n\theta$$

$$-\mu^4 n\rho\theta-\mu^4 n\theta^2-\mu^3 n\rho\theta^2-\alpha\delta\eta\gamma^2\mu-\alpha\delta\eta\gamma^2\rho-2\alpha\delta\eta\gamma\mu^2-2\alpha\delta\eta\gamma\mu\rho-\alpha\delta\eta\mu^3-\alpha\delta\eta\mu^2\rho-\alpha\delta\gamma^2\mu^2$$

$$-\alpha\delta\gamma^2\mu\rho-2\alpha\delta\gamma\mu^3-2\alpha\delta\gamma\mu^2\rho-\alpha\delta\mu^4-\alpha\delta\mu^3\rho-\alpha\eta\gamma^2\mu^2-\alpha\eta\gamma^2\mu\rho-2\alpha\eta\gamma\mu^3-2\alpha\eta\gamma\mu^2\rho-\alpha\eta\mu^4$$

$$-\alpha\eta\mu^3\rho-\alpha\gamma^2\mu^3-\alpha\gamma^2\mu^2\rho-2\alpha\gamma\mu^4-2\alpha\gamma\mu^3\rho-\alpha\mu^5-\alpha\mu^4\rho-\delta\eta\gamma^2\mu^2-\delta\eta\gamma^2\mu\rho-2\delta\eta\gamma\mu^3-2\delta\eta\gamma\mu^2\rho$$

$$-\delta\eta\mu^4-\delta\eta\mu^3\rho-\delta\gamma^2\mu^3-\delta\gamma^2\mu^2\rho-\delta\gamma^2\mu^2\theta-\delta\gamma^2\mu\rho\theta-2\delta\gamma\mu^4-2\delta\gamma\mu^3\rho-2\delta\gamma\mu^3\theta-2\delta\gamma\mu^2\rho\theta-\delta\mu^5-\delta\mu^4\rho$$

$$-\delta\mu^4\theta-\delta\mu^3\rho\theta-\eta\gamma^2\mu^3-\eta\gamma^2\mu^2\rho-\eta\gamma^2\mu^2\theta-\eta\gamma^2\mu\rho\theta-2\eta\gamma\mu^4-2\eta\gamma\mu^3\rho-2\eta\gamma\mu^3\theta-2\eta\gamma\mu^2\rho\theta-\eta\mu^5$$

$$-\eta\mu^4\rho-\eta\mu^4\theta-\eta\mu^3\rho\theta-\gamma^2\mu^4-\gamma^2\mu^3\rho-\gamma^2\mu^3\theta-\gamma^2\mu^2\rho\theta-2\gamma\mu^5-2\gamma\mu^4\rho-2\gamma\mu^4\theta-2\gamma\mu^3\rho\theta-\mu^6-\mu^5\rho-\mu^5\theta$$

$$-\mu^4\rho\theta)).\ R_f=(A\beta\delta^2\eta\gamma^2 m n^2\omega\tau^3\theta u_1 u_2^3-A\beta\delta^2\eta\gamma m n^2\omega\tau^3\theta^2 u_1 u_2^3+A\beta\delta^2\gamma^2 m\mu n^2\omega\tau^3\theta u_1 u_2^3$$

$$-A\beta\delta^2\gamma m\mu n^2\omega\tau^3\theta^2 u_1 u_2^3-\delta^2\gamma^2 m\mu n\omega\tau^4\theta^2 u_1 u_2^4-\delta\gamma^2 m\mu^2 n\omega\tau^4\theta^2 u_1 u_2^4-2A\beta\delta^2\eta\gamma^2 m n\omega\tau^3\theta u_1 u_2^3$$

$$+ A\beta\delta^2\eta\gamma m n\omega\tau^3\theta^2 u_1 u_2^3 - 2A\beta\delta^2\gamma^2 m\mu n\omega\tau^3\theta u_1 u_2^3 + A\beta\delta^2\gamma m\mu n\omega\tau^3\theta^2 u_1 u_2^3 - \delta^2\eta\gamma^2 m\mu n\tau^4\theta^2 u_2^4$$

$$- \delta^2\gamma^2 m\mu^2 n\tau^4\theta^2 u_2^4 + \delta^2\gamma^2 m\mu\omega\tau^4\theta^2 u_1 u_2^4 - \delta\eta\gamma^2 m\mu^2 n\tau^4\theta^2 u_2^4 - \delta\gamma^2 m\mu^3 n\tau^4\theta^2 u_2^4 + \delta\gamma^2 m\mu^2\omega\tau^4\theta^2 u_1 u_2^4$$

$$- A\alpha\beta\delta^2\eta\gamma m n^2\omega\tau^2\theta u_1 u_2^2 - A\alpha\beta\delta^2\gamma m\mu n^2\omega\tau^2\theta u_1 u_2^2 + 3A\beta\delta^2\eta\gamma^2 m n^2\omega\tau^2\theta u_1 u_2^2 - A\beta\delta^2\eta\gamma^2 m n^2\tau^3\theta u_2^3$$

$$+ A\beta\delta^2\eta\gamma^2 m\omega\tau^3\theta u_1 u_2^3 + A\beta\delta^2\eta\gamma m\mu n^2\omega\tau^2\theta u_1 u_2^2 - 3A\beta\delta^2\eta\gamma m n^2\omega\tau^2\theta^2 u_1 u_2^2 + A\beta\delta^2\eta\gamma m n^2\tau^3\theta^2 u_2^3$$

$$- A\beta\delta^2\eta m\mu n^2\omega\tau^2\theta^2 u_1 u_2^2 + 3A\beta\delta^2\gamma^2 m\mu n^2\omega\tau^2\theta u_1 u_2^2 - A\beta\delta^2\gamma^2 m\mu n^2\tau^3\theta u_2^3 + A\beta\delta^2\gamma^2 m\mu\omega\tau^3\theta u_1 u_2^3$$

$$+ A\beta\delta^2\gamma m\mu^2 n^2\omega\tau^2\theta u_1 u_2^2 - 3A\beta\delta^2\gamma m\mu n^2\omega\tau^2\theta^2 u_1 u_2^2 + A\beta\delta^2\gamma m\mu n^2\tau^3\theta^2 u_2^3 - A\beta\delta^2 m\mu^2 n^2\omega\tau^2\theta^2 u_1 u_2^2$$

$$- \alpha\delta^2\gamma^2 m\mu n\omega\tau^3\theta u_1 u_2^3 - \alpha\delta\gamma^2 m\mu^2 n\omega\tau^3\theta u_1 u_2^3 + \delta^2\eta\gamma^2 m\mu\tau^4\theta^2 u_2^4 - \delta^2\gamma^2 m\mu^2 n\omega\tau^3\theta u_1 u_2^3 + \delta^2\gamma^2 m\mu^2\tau^4\theta^2 u_2^4$$

$$- 4\delta^2\gamma^2 m\mu n\omega\tau^3\theta^2 u_1 u_2^3 - \delta^2\gamma^2\mu\omega\tau^4\theta^2 u_1 u_2^4 - 2\delta^2\gamma m\mu^2 n\omega\tau^3\theta^2 u_1 u_2^3 + \delta\eta\gamma^2 m\mu^2\tau^4\theta^2 u_2^4 - \delta\eta\gamma^2\mu\omega\tau^4\theta^2 u_1 u_2^4$$

$$- \delta\gamma^2 m\mu^3 n\omega\tau^3\theta u_1 u_2^3 + \delta\gamma^2 m\mu^3\tau^4\theta^2 u_2^4 - 4\delta\gamma^2 m\mu^2 n\omega\tau^3\theta^2 u_1 u_2^3 - 2\delta\gamma^2\mu^2\omega\tau^4\theta^2 u_1 u_2^4 - 2\delta\gamma m\mu^3 n\omega\tau^3\theta^2 u_1 u_2^3$$

$$- \eta\gamma^2\mu^2\omega\tau^4\theta^2 u_1 u_2^4 - \gamma^2\mu^3\omega\tau^4\theta^2 u_1 u_2^4 + A\alpha\beta\delta^2\eta\gamma m n\omega\tau^2\theta u_1 u_2^2 + A\alpha\beta\delta^2\gamma m\mu n\omega\tau^2\theta u_1 u_2^2$$

$$- 6A\beta\delta^2\eta\gamma^2 m n\omega\tau^2\theta u_1 u_2^2 + 2A\beta\delta^2\eta\gamma^2 m n\tau^3\theta u_2^3 - 3A\beta\delta^2\eta\gamma m\mu n\omega\tau^2\theta u_1 u_2^2 + 3A\beta\delta^2\eta\gamma m n\omega\tau^2\theta^2 u_1 u_2^2$$

$$- A\beta\delta^2\eta\gamma m n\tau^3\theta^2 u_2^3 + A\beta\delta^2\eta m\mu n\omega\tau^2\theta^2 u_1 u_2^2 - 6A\beta\delta^2\gamma^2 m\mu n\omega\tau^2\theta u_1 u_2^2 + 2A\beta\delta^2\gamma^2 m\mu n\tau^3\theta u_2^3$$

$$- 3A\beta\delta^2\gamma m\mu^2 n\omega\tau^2\theta u_1 u_2^2 + 3A\beta\delta^2\gamma m\mu n\omega\tau^2\theta^2 u_1 u_2^2 - A\beta\delta^2\gamma m\mu n\tau^3\theta^2 u_2^3 + A\beta\delta^2 m\mu^2 n\omega\tau^2\theta^2 u_1 u_2^2$$

$$- \alpha\delta^2\eta\gamma^2 m\mu n\tau^3\theta u_2^3 + \alpha\delta^2\eta\gamma^2 n\omega\tau^3\theta u_1 u_2^3 - \alpha\delta^2\gamma^2 m\mu^2 n\tau^3\theta u_2^3 + \alpha\delta^2\gamma^2 m\mu\omega\tau^3\theta u_1 u_2^3 - \alpha\delta\eta\gamma^2 m\mu^2 n\tau^3\theta u_2^3$$

$$+ \alpha\delta\eta\gamma^2\mu n\omega\tau^3\theta u_1 u_2^3 - \alpha\delta\gamma^2 m\mu^3 n\tau^3\theta u_2^3 + \alpha\delta\gamma^2 m\mu^2\omega\tau^3\theta u_1 u_2^3 - \delta^2\eta\gamma^2 m\mu^2 n\tau^3\theta u_2^3 - 4\delta^2\eta\gamma^2 m\mu n\tau^3\theta^2 u_2^3$$

$$+ \delta^2\gamma^2 m\mu^2\omega\tau^3\theta u_1 u_2^3 + 4\delta^2\gamma^2 m\mu\omega\tau^3\theta^2 u_1 u_2^3 - 2\delta^2\gamma m\mu^3 n\tau^3\theta^2 u_2^3 + 2\delta^2\gamma m\mu^2\omega\tau^3\theta^2 u_1 u_2^3 - \delta\eta\gamma^2 m\mu^3 n\tau^3\theta u_2^3$$

$$- 4\delta\eta\gamma^2 m\mu^2 n\tau^3\theta^2 u_2^3 + \delta\eta\gamma^2\mu^2 n\omega\tau^3\theta u_1 u_2^3 - 2\delta\eta\gamma m\mu^3 n\tau^3\theta^2 u_2^3 - \delta\eta\gamma\mu^2 n\omega\tau^3\theta^2 u_1 u_2^3 - \delta\gamma^2 m\mu^4 n\tau^3\theta u_2^3$$

$$- 4\delta\gamma^2 m\mu^3 n\tau^3\theta^2 u_2^3 + \delta\gamma^2 m\mu^3\omega\tau^3\theta u_1 u_2^3 + 4\delta\gamma^2 m\mu^2\omega\tau^3\theta^2 u_1 u_2^3 - 2\delta\gamma m\mu^4 n\tau^3\theta^2 u_2^3 + 2\delta\gamma m\mu^3\omega\tau^3\theta^2 u_1 u_2^3$$

$$- 2A\alpha\beta\delta^2\eta\gamma m n^2\omega\tau\theta u_1 u_2 + A\alpha\beta\delta^2\eta\gamma m n^2\tau^2\theta u_2^2 - A\alpha\beta\delta^2\eta m\mu n^2\omega\tau\theta u_1 u_2 - 2A\alpha\beta\delta^2\gamma m\mu n^2\omega\tau\theta u_1 u_2$$

$$+ A\alpha\beta\delta^2\gamma m\mu n^2\tau^2\theta u_2^2 - A\alpha\beta\delta^2 m\mu^2 n^2\omega\tau\theta u_1 u_2 + 3A\beta\delta^2\eta\gamma^2 m n^2\omega\tau\theta u_1 u_2 - 3A\beta\delta^2\eta\gamma^2 m n^2\tau^2\theta u_2^2$$

$$+ 3A\beta\delta^2\eta\gamma^2 m\omega\tau^2\theta u_1 u_2^2 - A\beta\delta^2\eta\gamma^2 m\tau^3\theta u_2^3 + 2A\beta\delta^2\eta\gamma m\mu n^2\omega\tau\theta u_1 u_2 - A\beta\delta^2\eta\gamma m\mu n^2\tau^2\theta u_2^2$$

$$+ 2A\beta\delta^2\eta\gamma m\mu\omega\tau^2\theta u_1 u_2^2 - 3A\beta\delta^2\eta\gamma m n^2\omega\tau\theta^2 u_1 u_2 + 3A\beta\delta^2\eta\gamma m n^2\tau^2\theta^2 u_2^2 - 2A\beta\delta^2\eta m\mu n^2\omega\tau\theta^2 u_1 u_2$$

$$- \delta\eta\gamma^2 m\mu^3 n\theta - \delta\eta\gamma^2 m\mu^2 n\theta^2 + \delta\eta\gamma^2\mu^3 n\omega u_1 + \delta\eta\gamma^2\mu^2 n\omega\theta u_1 - 2\delta\eta\gamma m\mu^4 n\theta - 2\delta\eta\gamma m\mu^3 n\theta^2 + \delta\eta\gamma\mu^4 n\omega u_1$$

$$- \delta\eta\gamma\mu^2 n\omega\theta^2 u_1 - \delta\eta m\mu^5 n\theta - \delta\eta m\mu^4 n\theta^2 - \delta\eta\mu^4 n\omega\theta u_1 - \delta\eta\mu^3 n\omega\theta^2 u_1 - \delta\gamma^2 m\mu^4 n\theta - \delta\gamma^2 m\mu^3 n\theta^2$$

$$+ \delta\gamma^2 m\mu^3\omega\theta u_1 + \delta\gamma^2 m\mu^2\omega\theta^2 u_1 - 2\delta\gamma m\mu^5 n\theta - 2\delta\gamma m\mu^4 n\theta^2 + 2\delta\gamma m\mu^4\omega\theta u_1 + 2\delta\gamma m\mu^3\omega\theta^2 u_1 - \delta m\mu^6 n\theta$$

$$- \delta m\mu^5 n\theta^2 + \delta m\mu^5\omega\theta u_1 + \delta m\mu^4\omega\theta^2 u_1 - A\beta\delta^2\eta\gamma^2 m\theta - 2A\beta\delta^2\eta\gamma m\mu\theta - A\beta\delta^2\eta m\mu^2\theta - A\beta\delta^2\gamma^2 m\mu\theta$$

$$- 2A\beta\delta^2\gamma m\mu^2\theta - A\beta\delta^2 m\mu^3\theta - \alpha^2\delta^2\eta\gamma^2\omega u_1 - 2\alpha^2\delta^2\eta\gamma\mu\omega u_1 - \alpha^2\delta^2\eta\mu^2\omega u_1 - \alpha^2\delta^2\gamma^2\mu\omega u_1 - 2\alpha^2\delta^2\gamma\mu^2\omega u_1$$

$$- \alpha^2\delta^2\mu^3\omega u_1 - 2\alpha^2\delta\eta\gamma^2\mu\omega u_1 - 4\alpha^2\delta\eta\gamma\mu^2\omega u_1 - 2\alpha^2\delta\eta\mu^3\omega u_1 - 2\alpha^2\delta\gamma^2\mu^2\omega u_1 - 4\alpha^2\delta\gamma\mu^3\omega u_1 - 2\alpha^2\delta\mu^4\omega u_1$$

$$- \alpha^2\eta\gamma^2\mu^2\omega u_1 - 2\alpha^2\eta\gamma\mu^3\omega u_1 - \alpha^2\eta\mu^4\omega u_1 - \alpha^2\gamma^2\mu^3\omega u_1 - 2\alpha^2\gamma\mu^4\omega u_1 - \alpha^2\mu^5\omega u_1 + \alpha\delta^2\eta\gamma^2 m\mu\theta$$

$$- 2\alpha\delta^2\eta\gamma^2\mu\omega u_1 - \alpha\delta^2\eta\gamma^2\omega\theta u_1 + 2\alpha\delta^2\eta\gamma m\mu^2\theta - 4\alpha\delta^2\eta\gamma\mu^2\omega u_1 - 2\alpha\delta^2\eta\gamma\mu\omega\theta u_1 + \alpha\delta^2\eta m\mu^3\theta$$

$$+\delta\eta\gamma\mu n\rho-\delta\eta m\mu^2\theta-\delta\eta\mu^2 n\theta-\delta\eta\mu n\rho\theta-\alpha\delta\eta\gamma\mu-\alpha\delta\eta\gamma\rho-\alpha\delta\eta\mu^2-\alpha\delta\eta\mu\rho-\alpha\delta\gamma\mu^2-\alpha\delta\gamma\mu\rho-\alpha\delta\mu^3$$

$$-\alpha\delta\mu^2\rho-\alpha\eta\gamma\mu^2-\alpha\eta\gamma\mu\rho-\alpha\eta\mu^3-\alpha\eta\mu^2\rho-\alpha\gamma\mu^3-\alpha\gamma\mu^2\rho-\alpha\mu^4-\alpha\mu^3\rho-\delta\eta\gamma\mu^2-\delta\eta\gamma\mu\rho-\delta\eta\mu^3$$

$$-\delta\eta\mu^2\rho-\delta\gamma\mu^3-\delta\gamma\mu^2\rho-\delta\gamma\mu^2\theta-\delta\gamma\mu\rho\theta-\delta\mu^4-\delta\mu^3\rho-\delta\mu^3\theta-\delta\mu^2\rho\theta-\eta\gamma\mu^3-\eta\gamma\mu^2\rho-\eta\gamma\mu^2\theta-\eta\gamma\mu\rho\theta$$

$$-\eta\mu^4-\eta\mu^3\rho-\eta\mu^3\theta-\eta\mu^2\rho\theta-\gamma\mu^4-\gamma\mu^3\rho-\gamma\mu^3\theta-\gamma\mu^2\rho\theta-\mu^5-\mu^4\rho-\mu^4\theta-\mu^3\rho\theta\big)\beta\big),\mathcal{R}_p=$$

$$-\big(A\beta\delta^2\gamma^2 m\mu n^2\omega\tau^3\theta u_1 u_2^3-A\beta\delta^2\gamma m\mu n^2\omega\tau^3\theta^2 u_1 u_2^3-\delta^2\gamma^2 m\mu n\omega\tau^4\theta^2 u_1 u_2^4-\delta\gamma^2 m\mu^2 n\omega\tau^4\theta^2 u_1 u_2^4$$
$$-2A\beta\delta^2\gamma^2 m\mu n\omega\tau^3\theta u_1 u_2^3+A\beta\delta^2\gamma m\mu n\omega\tau^3\theta^2 u_1 u_2^3-\delta^2\gamma^2 m\mu^2 n\tau^4\theta^2 u_2^4+\delta^2\gamma^2 m\mu\omega\tau^4\theta^2 u_1 u_2^4-\delta\gamma^2 m\mu^3 n\tau^4\theta^2 u_2^4$$
$$+\delta\gamma^2 m\mu^2\omega\tau^4\theta^2 u_1 u_2^4-A\alpha\beta\delta^2\gamma m\mu n^2\omega\tau^2\theta u_1 u_2^2+3A\beta\delta^2\gamma^2 m\mu n^2\omega\tau^2\theta u_1 u_2^2-A\beta\delta^2\gamma^2 m\mu n^2\tau^3\theta u_2^2$$
$$+A\beta\delta^2\gamma^2 m\mu\omega\tau^3\theta u_1 u_2^2+A\beta\delta^2\gamma^2 n\mu\omega\tau^3\theta u_1 u_2^2+A\beta\delta^2\gamma^2 n\omega\rho\tau^3\theta u_1 u_2^2+A\beta\delta^2\gamma m\mu^2 n^2\omega\tau^2\theta u_1 u_2^2$$
$$-3A\beta\delta^2\gamma m\mu n^2\omega\tau^2\theta^2 u_1 u_2^2+A\beta\delta^2\gamma m\mu n^2\tau^3\theta^2 u_2^2-A\beta\delta^2\gamma\mu n\omega\tau^3\theta^2 u_1 u_2^3-A\beta\delta^2\gamma n\omega\rho\tau^3\theta^2 u_1 u_2^2$$
$$-A\beta\delta^2 m\mu^2 n^2\omega\tau^2\theta^2 u_1 u_2^2-\alpha\delta^2\gamma^2 m\mu n\omega\tau^3\theta u_1 u_2^3-\alpha\delta\gamma^2 m\mu^2 n\omega\tau^3\theta u_1 u_2^3-\delta^2\gamma^2 m\mu^2 n\omega\tau^3\theta u_1 u_2^3+\delta^2\gamma^2 m\mu^2\tau^4\theta^2 u_2^4$$
$$-4\delta^2\gamma^2 m\mu n\omega\tau^3\theta^2 u_1 u_2^3-\delta^2\gamma^2\mu\omega\tau^4\theta^2 u_1 u_2^4-2\delta^2\gamma m\mu^2 n\omega\tau^3\theta^2 u_1 u_2^3-\delta\gamma^2 m\mu^3 n\omega\tau^3\theta u_1 u_2^3+\delta\gamma^2 m\mu^3\tau^4\theta^2 u_2^4$$
$$+2A\alpha\beta\delta^2\gamma m\mu n\omega\tau\theta u_1 u_2-A\alpha\beta\delta^2\gamma m\mu n\tau^2\theta u_2^2-A\alpha\beta\delta^2\gamma\mu^2 n^2\omega\tau u_1 u_2-A\alpha\beta\delta^2\gamma\mu n^2\omega\rho\tau u_1 u_2$$
$$-2A\alpha\beta\delta^2\gamma\mu n^2\omega\tau\theta u_1 u_2+A\alpha\beta\delta^2\gamma\mu n^2\tau^2\theta u_2^2-2A\alpha\beta\delta^2\gamma n^2\omega\rho\tau\theta u_1 u_2+A\alpha\beta\delta^2\gamma n^2\rho\tau^2\theta u_2^2$$
$$+A\alpha\beta\delta^2 m\mu^2 n\omega\tau\theta u_1 u_2+A\alpha\beta\delta^2\mu^2 n^2\omega\tau\theta u_1 u_2+A\alpha\beta\delta^2\mu n^2\omega\rho\tau\theta u_1 u_2-6A\beta\delta^2\gamma^2 m\mu n\omega\tau\theta u_1 u_2$$
$$+6A\beta\delta^2\gamma^2 m\mu n\tau^2\theta u_2^2+2A\beta\delta^2\gamma^2\mu^2 n^2\omega\tau u_1 u_2-A\beta\delta^2\gamma^2\mu^2 n^2\tau^2 u_2^2+2A\beta\delta^2\gamma^2\mu n^2\omega\rho\tau u_1 u_2-A\beta\delta^2\gamma^2\mu n^2\rho\tau^2 u_2^2$$
$$-3A\beta\delta^2\gamma^2\mu\omega\tau^2\theta u_1 u_2^2+A\beta\delta^2\gamma^2\mu\tau^3\theta u_2^2-3A\beta\delta^2\gamma^2\omega\rho\tau^2\theta u_1 u_2^2+A\beta\delta^2\gamma^2\rho\tau^3\theta u_2^2-6A\beta\delta^2\gamma m\mu^2 n\omega\tau\theta u_1 u_2$$
$$+3A\beta\delta^2\gamma m\mu^2 n\tau^2\theta u_2^2+3A\beta\delta^2\gamma m\mu n\omega\tau^2\theta^2 u_1 u_2-3A\beta\delta^2\gamma m\mu n\tau^2\theta^2 u_2^2-4A\beta\delta^2\gamma\mu^2 n^2\omega\tau\theta u_1 u_2+2A\beta\delta^2\gamma\mu^2 n^2\tau^2\theta$$
$$u_2^2-2A\beta\delta^2\gamma\mu^2\omega\tau^2\theta u_1 u_2^2-4A\beta\delta^2\gamma\mu n^2\omega\rho\tau\theta u_1 u_2+2A\beta\delta^2\gamma\mu n^2\rho\tau^2\theta u_2^2-2A\beta\delta^2\gamma\mu\omega\rho\tau^2\theta u_1 u_2^2$$
$$-A\beta\delta^2 m\mu^3 n\omega\tau\theta u_1 u_2+2A\beta\delta^2 m\mu^2 n\omega\tau\theta^2 u_1 u_2-A\beta\delta^2 m\mu^2 n\tau^2\theta^2 u_2^2+2A\beta\delta^2\mu^2 n^2\omega\tau\theta^2 u_1 u_2-A\beta\delta^2\mu^2 n^2\tau^2\theta^2 u_2^2$$
$$+2A\beta\delta^2\mu n^2\omega\rho\tau\theta^2 u_1 u_2-A\beta\delta^2\mu n^2\rho\tau^2\theta^2 u_2^2-\alpha^2\delta^2\gamma^2\mu n\omega\tau^2 u_1 u_2^2-\alpha^2\delta^2\gamma^2 n\omega\rho\tau^2 u_1 u_2^2-\alpha^2\delta\gamma^2\mu^2 n\omega\tau^2 u_1 u_2^2$$
$$-\alpha^2\delta\gamma^2\mu n\omega\rho\tau^2 u_1 u_2^2-3\alpha\delta^2\gamma^2 m\mu^2 n\tau^2\theta u_2^2+3\alpha\delta^2\gamma^2 m\mu\omega\tau^2\theta u_1 u_2^2-2\alpha\delta^2\gamma^2\mu^2 n\omega\tau^2 u_1 u_2^2-\alpha\delta^2\gamma^2\mu^2\tau^3\theta u_2^3$$
$$-2\alpha\delta^2\gamma^2\mu n\omega\rho\tau^2 u_1 u_2^2-3\alpha\delta^2\gamma^2\mu n\omega\tau^2\theta u_1 u_2^2-\alpha\delta^2\gamma^2\mu\rho\tau^3\theta u_2^3-3\alpha\delta^2\gamma^2 n\omega\rho\tau^2\theta u_1 u_2^2-2\alpha\delta^2\gamma m\mu^3 n\tau^2\theta u_2^2$$
$$+2\alpha\delta^2\gamma m\mu^2\omega\tau^2\theta u_1 u_2^2-3\alpha\delta\gamma^2 m\mu^3 n\tau^2\theta u_2^2+3\alpha\delta\gamma^2 m\mu^2\omega\tau^2\theta u_1 u_2^2-2\alpha\delta\gamma^2\mu^3 n\omega\tau^2 u_1 u_2^2-\alpha\delta\gamma^2\mu^3\tau^3\theta u_2^3$$
$$-2\alpha\delta\gamma^2\mu^2 n\omega\rho\tau^2 u_1 u_2^2-3\alpha\delta\gamma^2\mu^2 n\omega\tau^2\theta u_1 u_2^2-\alpha\delta\gamma^2\mu^2\rho\tau^3\theta u_2^3-3\alpha\delta\gamma^2\mu n\omega\rho\tau^2\theta u_1 u_2^2-2\alpha\delta\gamma m\mu^4 n\tau^2\theta u_2^2$$
$$+2\alpha\delta\gamma m\mu^3\omega\tau^2\theta u_1 u_2^2-3\delta^2\gamma^2 m\mu^3 n\tau^2\theta u_2^2-6\delta^2\gamma^2 m\mu^2 n\tau^2\theta^2 u_2^2+3\delta^2\gamma^2 m\mu^2\omega\tau^2\theta u_1 u_2^2+6\delta^2\gamma^2 m\mu\omega\tau^2\theta^2 u_1 u_2^2$$
$$+4A\beta\delta^2\gamma\mu n\omega\rho\tau\theta u_1 u_2-3A\beta\delta^2\gamma\mu n\omega\tau\theta^2 u_1 u_2-2A\beta\delta^2\gamma\mu n\rho\tau^2\theta u_2^2+3A\beta\delta^2\gamma\mu n\tau^2\theta^2 u_2^2-3A\beta\delta^2\gamma n\omega\rho\tau\theta^2 u_1 u_2$$
$$+3A\beta\delta^2\gamma n\rho\tau^2\theta^2 u_2^2+A\beta\delta^2 m\mu^3\omega\tau\theta u_1 u_2-A\beta\delta^2 m\mu^2 n^2\omega\theta^2 u_1+2A\beta\delta^2 m\mu^2 n^2\tau\theta^2 u_2+A\beta\delta^2\mu^3 n\omega\tau\theta u_1 u_2$$
$$+A\beta\delta^2\mu^2 n\omega\rho\tau\theta u_1 u_2-2A\beta\delta^2\mu^2 n\omega\tau\theta^2 u_1 u_2+A\beta\delta^2\mu^2 n\tau^2\theta^2 u_2^2-2A\beta\delta^2\mu n\omega\rho\tau\theta^2 u_1 u_2+A\beta\delta^2\mu n\rho\tau^2\theta^2 u_2^2$$
$$-\alpha^2\delta^2\gamma^2\mu^2 n\tau^2 u_2^2-\alpha^2\delta^2\gamma^2\mu n\rho\tau^2 u_2^2+\alpha^2\delta^2\gamma^2\omega\rho\tau^2 u_1 u_2^2-\alpha^2\delta\gamma^2\mu^3 n\tau^2 u_2^2-\alpha^2\delta\gamma^2\mu^2 n\rho\tau^2 u_2^2+2\alpha^2\delta\gamma^2\mu\omega\rho\tau^2 u_1 u_2^2$$
$$+\alpha^2\gamma^2\mu^2\omega\rho\tau^2 u_1 u_2^2+3\alpha\delta^2\gamma^2 m\mu^2\tau^2\theta u_2^2-3\alpha\delta^2\gamma^2 m\mu n\omega\tau\theta u_1 u_2^2-2\alpha\delta^2\gamma^2\mu^3 n\tau^2 u_2^2-2\alpha\delta^2\gamma^2\mu^2 n\rho\tau^2 u_2^2$$
$$-3\alpha\delta^2\gamma^2\mu^2 n\tau^2\theta u_2^2-3\alpha\delta^2\gamma^2\mu n\rho\tau^2\theta u_2^2+2\alpha\delta^2\gamma^2\mu\omega\rho\tau^2 u_1 u_2^2-3\alpha\delta^2\gamma^2\mu\omega\tau^2\theta u_1 u_2^2+3\alpha\delta^2\gamma^2\omega\rho\tau^2\theta u_1 u_2^2$$
$$+2\alpha\delta^2\gamma m\mu^3\tau^2\theta u_2^2-4\alpha\delta^2\gamma m\mu^2 n\omega\tau\theta u_1 u_2-2\alpha\delta^2\gamma\mu^2\omega\tau^2\theta u_1 u_2^2+2\alpha\delta^2\gamma\mu\omega\rho\tau^2\theta u_1 u_2^2-\alpha\delta^2 m\mu^3 n\omega\tau\theta u_1 u_2$$
$$+3\alpha\delta\gamma^2 m\mu^3\tau^2\theta u_2^2-3\alpha\delta\gamma^2 m\mu^2 n\omega\tau\theta u_1 u_2-2\alpha\delta\gamma^2\mu^4 n\tau^2 u_2^2-2\alpha\delta\gamma^2\mu^3 n\rho\tau^2 u_2^2-3\alpha\delta\gamma^2\mu^3 n\tau^2\theta u_2^2$$
$$-3\alpha\delta\gamma^2\mu^2 n\rho\tau^2\theta u_2^2+4\alpha\delta\gamma^2\mu^2\omega\rho\tau^2 u_1 u_2^2-3\alpha\delta\gamma^2\mu^2\omega\tau^2\theta u_1 u_2^2+9\alpha\delta\gamma^2\mu\omega\rho\tau^2\theta u_1 u_2^2+2\alpha\delta\gamma m\mu^4\tau^2\theta u_2^2$$
$$-4\alpha\delta\gamma m\mu^3 n\omega\tau\theta u_1 u_2-2\alpha\delta\gamma\mu^3\omega\tau^2\theta u_1 u_2^2+6\alpha\delta\gamma\mu^2\omega\rho\tau^2\theta u_1 u_2^2-\alpha\delta m\mu^4 n\omega\tau\theta u_1 u_2+2\alpha\gamma^2\mu^3\omega\rho\tau^2 u_1 u_2^2$$
$$+6\alpha\gamma^2\mu^2\omega\rho\tau^2\theta u_1 u_2^2+4\alpha\gamma\mu^3\omega\rho\tau^2\theta u_1 u_2^2+3\delta^2\gamma^2 m\mu^3\tau^2\theta u_2^2-3\delta^2\gamma^2 m\mu^2 n\omega\tau\theta u_1 u_2+6\delta^2\gamma^2 m\mu^2\tau^2\theta^2 u_2^2$$
$$-4\delta^2\gamma^2 m\mu n\omega\tau\theta^2 u_1 u_2-\delta^2\gamma^2\mu^4 n\tau^2 u_2^2-\delta^2\gamma^2\mu^3 n\rho\tau^2 u_2^2-3\delta^2\gamma^2\mu^3 n\tau^2\theta u_2^2-3\delta^2\gamma^2\mu^2 n\rho\tau^2\theta u_2^2+\delta^2\gamma^2\mu^2\omega\rho\tau^2 u_1 u_2^2$$
$$-3\delta^2\gamma^2\mu^2\omega\tau^2\theta u_1 u_2^2+3\delta^2\gamma^2\mu\omega\rho\tau^2\theta u_1 u_2^2-6\delta^2\gamma^2\mu\omega\tau^2\theta^2 u_1 u_2^2+2\delta^2\gamma m\mu^4\tau^2\theta u_2^2-4\delta^2\gamma m\mu^3 n\omega\tau\theta u_1 u_2$$
$$+6\delta^2\gamma m\mu^3\tau^2\theta^2 u_2^2-6\delta^2\gamma m\mu^2 n\omega\tau\theta^2 u_1 u_2+3\delta^2\gamma\mu^3 n\tau^2\theta^2 u_2^2-2\delta^2\gamma\mu^3\omega\tau^2\theta u_1 u_2^2+3\delta^2\gamma\mu^2 n\rho\tau^2\theta^2 u_2^2$$
$$-2\delta\gamma m\mu^4 n\theta^2+2\delta\gamma m\mu^4\omega\theta u_1+2\delta\gamma m\mu^3\omega\theta^2 u_1-\delta\gamma\mu^5 n\omega u_1-4\delta\gamma\mu^5\tau\theta u_2-\delta\gamma\mu^4 n\omega\rho u_1-4\delta\gamma\mu^4\rho\tau\theta u_2$$
$$-6\delta\gamma\mu^4\tau\theta^2 u_2+\delta\gamma\mu^3 n\omega\theta^2 u_1-6\delta\gamma\mu^3\rho\tau\theta^2 u_2+\delta\gamma\mu^2 n\omega\rho\theta^2 u_1-\delta m\mu^6 n\theta-\delta m\mu^5 n\theta^2+\delta m\mu^5\omega\theta u_1$$
$$+\delta m\mu^4\omega\theta^2 u_1-\delta\mu^6\tau\theta u_2+\delta\mu^5 n\omega\theta u_1-\delta\mu^5\rho\tau\theta u_2-2\delta\mu^5\tau\theta^2 u_2+\delta\mu^4 n\omega\rho\theta u_1+\delta\mu^4 n\omega\theta^2 u_1-2\delta\mu^4\rho\tau\theta^2 u_2$$
$$+\delta\mu^3 n\omega\rho\theta^2 u_1+A\alpha\beta\delta^2\gamma^2\mu n+A\alpha\beta\delta^2\gamma^2 n\rho+A\alpha\beta\delta^2\gamma\mu^2 n+A\alpha\beta\delta^2\gamma\mu n\rho+A\alpha\beta\delta^2\gamma\mu n\theta+A\alpha\beta\delta^2\gamma n\rho\theta$$
$$+A\alpha\beta\delta^2\mu^2 n\theta+A\alpha\beta\delta^2\mu n\rho\theta-A\beta\delta^2\gamma^2 m\mu\theta+A\beta\delta^2\gamma^2\mu^2 n+A\beta\delta^2\gamma^2\mu n\rho-A\beta\delta^2\gamma^2\mu n\theta-A\beta\delta^2\gamma^2 n\rho\theta$$
$$-2A\beta\delta^2\gamma m\mu^2\theta+A\beta\delta^2\gamma\mu^3 n+A\beta\delta^2\gamma\mu^2 n\rho-2A\beta\delta^2\gamma\mu^2 n\theta-2A\beta\delta^2\gamma\mu n\rho\theta+A\beta\delta^2\gamma\mu n\theta^2+A\beta\delta^2\gamma n\rho\theta^2$$
$$-A\beta\delta^2 m\mu^3\theta-A\beta\delta^2\mu^3 n\theta-A\beta\delta^2\mu^2 n\rho\theta+A\beta\delta^2\mu^2 n\theta^2+A\beta\delta^2\mu n\rho\theta^2-\alpha^2\delta^2\gamma^2\mu^2 n-\alpha^2\delta^2\gamma^2\mu n\rho+\alpha^2\delta^2\gamma^2\omega\rho u_1$$
$$-\alpha^2\delta^2\gamma\mu^3 n-\alpha^2\delta^2\gamma\mu^2 n\rho+2\alpha^2\delta^2\gamma\mu\omega\rho u_1+\alpha^2\delta^2\mu^2\omega\rho u_1-\alpha^2\delta\gamma^2\mu^3 n-\alpha^2\delta\gamma^2\mu^2 n\rho+2\alpha^2\delta\gamma^2\mu\omega\rho u_1$$
$$-\alpha^2\delta\gamma\mu^4 n-\alpha^2\delta\gamma\mu^3 n\rho+4\alpha^2\delta\gamma\mu^2\omega\rho u_1+2\alpha^2\delta\mu^3\omega\rho u_1+\alpha^2\gamma^2\mu^2\omega\rho u_1+2\alpha^2\gamma\mu^3\omega\rho u_1+\alpha^2\mu^4\omega\rho u_1$$
$$+\alpha\delta^2\gamma^2 m\mu^2\theta-2\alpha\delta^2\gamma^2\mu^3 n-2\alpha\delta^2\gamma^2\mu^2 n\rho-\alpha\delta^2\gamma^2\mu^2 n\theta-\alpha\delta^2\gamma^2\mu n\rho\theta+2\alpha\delta^2\gamma^2\mu\omega\rho u_1-\alpha\delta^2\gamma^2\mu\omega\theta u_1$$
$$+\alpha\delta^2\gamma^2\omega\rho\theta u_1+2\alpha\delta^2\gamma m\mu^3\theta-2\alpha\delta^2\gamma\mu^4 n-2\alpha\delta^2\gamma\mu^3 n\rho+4\alpha\delta^2\gamma\mu^2\omega\rho u_1-2\alpha\delta^2\gamma\mu^2\omega\theta u_1+2\alpha\delta^2\gamma\mu\omega\rho\theta u_1$$
$$+\alpha\delta^2 m\mu^4\theta+\alpha\delta^2\mu^4 n\theta+\alpha\delta^2\mu^3 n\rho\theta+2\alpha\delta^2\mu^3\omega\rho u_1-\alpha\delta^2\mu^3\omega\theta u_1+\alpha\delta^2\mu^2\omega\rho\theta u_1+\alpha\delta\gamma^2 m\mu^3\theta-2\alpha\delta\gamma^2\mu^4 n$$
$$-2\alpha\delta\gamma^2\mu^3 n\rho-\alpha\delta\gamma^2\mu^3 n\theta-\alpha\delta\gamma^2\mu^2 n\rho\theta+4\alpha\delta\gamma^2\mu^2\omega\rho u_1-\alpha\delta\gamma^2\mu^2\omega\theta u_1+3\alpha\delta\gamma^2\mu\omega\rho\theta u_1+2\alpha\delta\gamma m\mu^4\theta$$
$$-2\alpha\delta\gamma\mu^5 n-2\alpha\delta\gamma\mu^4 n\rho+8\alpha\delta\gamma\mu^3\omega\rho u_1-2\alpha\delta\gamma\mu^3\omega\theta u_1+6\alpha\delta\gamma\mu^2\omega\rho\theta u_1+\alpha\delta m\mu^5\theta+\alpha\delta\mu^5 n\theta+\alpha\delta\mu^4 n\rho\theta$$
$$+4\alpha\delta\mu^4\omega\rho u_1-\alpha\delta\mu^4\omega\theta u_1+3\alpha\delta\mu^3\omega\rho\theta u_1+2\alpha\gamma^2\mu^3\omega\rho u_1+2\alpha\gamma^2\mu^2\omega\rho\theta u_1+4\alpha\gamma\mu^4\omega\rho u_1+4\alpha\gamma\mu^3\omega\rho\theta u_1$$

$$+2\alpha\mu^5\omega\rho u_1+2\alpha\mu^4\omega\rho\theta u_1+\delta^2\gamma^2 m\mu^3\theta+\delta^2\gamma^2 m\mu^2\theta^2-\delta^2\gamma^2\mu^4 n-\delta^2\gamma^2\mu^3 n\rho-\delta^2\gamma^2\mu^3 n\theta-\delta^2\gamma^2\mu^2 n\rho\theta$$
$$+\delta^2\gamma^2\mu^2\omega\rho u_1-\delta^2\gamma^2\mu^2\omega\theta u_1+\delta^2\gamma^2\mu\omega\rho\theta u_1-\delta^2\gamma^2\mu\omega\theta^2 u_1+2\delta^2\gamma m\mu^4\theta+2\delta^2\gamma m\mu^3\theta^2-\delta^2\gamma\mu^5 n-\delta^2\gamma\mu^4 n\rho$$
$$+\delta^2\gamma\mu^3 n\theta^2+2\delta^2\gamma\mu^3\omega\rho u_1-2\delta^2\gamma\mu^3\omega\theta u_1+\delta^2\gamma\mu^2 n\rho\theta^2+2\delta^2\gamma\mu^2\omega\rho\theta u_1-2\delta^2\gamma\mu^2\omega\theta^2 u_1+\delta^2 m\mu^5\theta+\delta^2 m\mu^4\theta^2$$
$$+\delta^2\mu^5 n\theta+\delta^2\mu^4 n\rho\theta+\delta^2\mu^4 n\theta^2+\delta^2\mu^4\omega\rho u_1-\delta^2\mu^4\omega\theta u_1+\delta^2\mu^3 n\rho\theta^2+\delta^2\mu^3\omega\rho\theta u_1-\delta^2\mu^3\omega\theta^2 u_1+\delta\gamma^2 m\mu^4\theta$$
$$+\delta\gamma^2 m\mu^3\theta^2-\delta\gamma^2\mu^5 n-\delta\gamma^2\mu^4 n\rho-\delta\gamma^2\mu^4 n\theta-\delta\gamma^2\mu^3 n\rho\theta+2\delta\gamma^2\mu^3\omega\rho u_1-\delta\gamma^2\mu^3\omega\theta u_1+3\delta\gamma^2\mu^2\omega\rho\theta u_1$$
$$-\delta\gamma^2\mu^2\omega\theta^2 u_1+\delta\gamma^2\mu\omega\rho\theta^2 u_1+2\delta\gamma m\mu^5\theta+2\delta\gamma m\mu^4\theta^2-\delta\gamma\mu^6 n-\delta\gamma\mu^5 n\rho+\delta\gamma\mu^4 n\theta^2+4\delta\gamma\mu^4\omega\rho u_1$$
$$-2\delta\gamma\mu^4\omega\theta u_1+\delta\gamma\mu^3 n\rho\theta^2+6\delta\gamma\mu^3\omega\rho\theta u_1-2\delta\gamma\mu^3\omega\theta^2 u_1+2\delta\gamma\mu^2\omega\rho\theta^2 u_1+\delta m\mu^6\theta+\delta m\mu^5\theta^2+\delta\mu^6 n\theta$$
$$+\delta\mu^5 n\rho\theta+\delta\mu^5 n\theta^2+2\delta\mu^5\omega\rho u_1-\delta\mu^5\omega\theta u_1+\delta\mu^4 n\rho\theta^2+3\delta\mu^4\omega\rho\theta u_1-\delta\mu^4\omega\theta^2 u_1+\delta\mu^3\omega\rho\theta^2 u_1+\gamma^2\mu^4\omega\rho u_1$$
$$+2\gamma^2\mu^3\omega\rho\theta u_1+\gamma^2\mu^2\omega\rho\theta^2 u_1+2\gamma\mu^5\omega\rho u_1+4\gamma\mu^4\omega\rho\theta u_1+2\gamma\mu^3\omega\rho\theta^2 u_1+\mu^6\omega\rho u_1+2\mu^5\omega\rho\theta u_1+\mu^4\omega\rho\theta^2 u_1$$
$$+A\beta\delta^2\gamma^2\mu\theta+A\beta\delta^2\gamma^2\rho\theta+2A\beta\delta^2\gamma\mu^2\theta+2A\beta\delta^2\gamma\mu\rho\theta+A\beta\delta^2\mu^3\theta+A\beta\delta^2\mu^2\rho\theta-\alpha\delta^2\gamma^2\mu^2\theta-\alpha\delta^2\gamma^2\mu\rho\theta$$
$$-2\alpha\delta^2\gamma\mu^3\theta-2\alpha\delta^2\gamma\mu^2\rho\theta-\alpha\delta^2\mu^4\theta-\alpha\delta^2\mu^3\rho\theta-\alpha\delta\gamma^2\mu^3\theta-\alpha\delta\gamma^2\mu^2\rho\theta-2\alpha\delta\gamma\mu^4\theta-2\alpha\delta\gamma\mu^3\rho\theta-\alpha\delta\mu^5\theta$$
$$-\alpha\delta\mu^4\rho\theta-\delta^2\gamma^2\mu^3\theta-\delta^2\gamma^2\mu^2\rho\theta-\delta^2\gamma^2\mu^2\theta^2-\delta^2\gamma^2\mu\rho\theta^2-2\delta^2\gamma\mu^4\theta-2\delta^2\gamma\mu^3\rho\theta-2\delta^2\gamma\mu^3\theta^2-2\delta^2\gamma\mu^2\rho\theta^2$$
$$-\delta^2\mu^5\theta-\delta^2\mu^4\rho\theta-\delta^2\mu^4\theta^2-\delta^2\mu^3\rho\theta^2-\delta\gamma^2\mu^4\theta-\delta\gamma^2\mu^3\rho\theta-\delta\gamma^2\mu^3\theta^2-\delta\gamma^2\mu^2\rho\theta^2-2\delta\gamma\mu^5\theta-2\delta\gamma\mu^4\rho\theta$$
$$-2\delta\gamma\mu^4\theta^2-2\delta\gamma\mu^3\rho\theta^2-\delta\mu^6\theta-\delta\mu^5\rho\theta-\delta\mu^5\theta^2-\delta\mu^4\rho\theta^2\Big)\Big/\Big(\big(\delta\eta\gamma^2 m\mu n^2\omega\tau^3\theta u_1 u_2^3-\delta\eta\gamma m\mu n^2\omega\tau^3\theta^2 u_1 u_2^3$$

$$-2\alpha\gamma\mu\rho\tau u_2+2\alpha\gamma\mu\omega u_1-2\alpha\gamma\mu\tau u_2+2\alpha\gamma\mu\omega\rho u_1-2\alpha\gamma\mu\rho\tau u_2+\alpha\mu\omega u_1+\alpha\mu\omega\rho u_1+2\delta\eta\gamma m\mu n\theta$$
$$-\delta\eta\gamma^2\mu^2 n^2+\delta\eta\gamma^2\mu^2\omega u_1-2\delta\eta\gamma^2\mu^2\tau u_2-\delta\eta\gamma^2\mu n^2\rho+\delta\eta\gamma^2\mu\omega\rho u_1-2\delta\eta\gamma^2\mu\rho\tau u_2+3\delta\eta\gamma m\mu^2 n\theta$$
$$-\delta\eta\gamma m\mu n\theta^2+2\delta\eta\gamma\mu^3\omega u_1-2\delta\eta\gamma\mu^3\tau u_2+2\delta\eta\gamma\mu^2 n^2\theta+2\delta\eta\gamma\mu^2\omega\rho u_1-2\delta\eta\gamma\mu^2\rho\tau u_2+2\delta\eta\gamma\mu n^2\rho\theta$$
$$+\delta\eta m\mu^3 n\theta-\delta\eta m\mu^2 n\theta^2+\delta\eta\mu^4\omega u_1+\delta\eta\mu^3\omega\rho u_1-\delta\eta\mu^2 n^2\theta^2-\delta\eta\mu n^2\rho\theta^2+\delta\gamma^2\mu^3\omega u_1-2\delta\gamma^2\mu^3\tau u_2$$
$$+\delta\gamma^2\mu^2\omega\rho u_1+\delta\gamma^2\mu^2\omega\theta u_1-2\delta\gamma^2\mu^2\rho\tau u_2-3\delta\gamma^2\mu^2\tau\theta u_2+\delta\gamma^2\mu\omega\rho\theta u_1-3\delta\gamma^2\mu\rho\tau\theta u_2+2\delta\gamma\mu^4\omega u_1$$
$$-2\delta\gamma\mu^4\tau u_2+2\delta\gamma\mu^3\omega\rho u_1+2\delta\gamma\mu^3\omega\theta u_1-2\delta\gamma\mu^3\rho\tau u_2-4\delta\gamma\mu^3\tau\theta u_2+2\delta\gamma\mu^2\omega\rho\theta u_1-4\delta\gamma\mu^2\rho\tau\theta u_2+\delta\mu^5\omega u_1$$
$$+\delta\mu^4\omega\rho u_1+\delta\mu^4\omega\theta u_1-\delta\mu^4\tau\theta u_2+\delta\mu^3\omega\rho\theta u_1-\delta\mu^3\rho\tau\theta u_2+\eta\gamma^2\mu^3\omega u_1-2\eta\gamma^2\mu^3\tau u_2+\eta\gamma^2\mu^2\omega\rho u_1$$
$$+\eta\gamma^2\mu^2\omega\theta u_1-2\eta\gamma^2\mu^2\rho\tau u_2-3\eta\gamma^2\mu^2\tau\theta u_2+\eta\gamma^2\mu\omega\rho\theta u_1-3\eta\gamma^2\mu\rho\tau\theta u_2+2\eta\gamma\mu^4\omega u_1-2\eta\gamma\mu^4\tau u_2$$
$$+2\eta\gamma\mu^3\omega\rho u_1+2\eta\gamma\mu^3\omega\theta u_1-2\eta\gamma\mu^3\rho\tau u_2-4\eta\gamma\mu^3\tau\theta u_2+2\eta\gamma\mu^2\omega\rho\theta u_1-4\eta\gamma\mu^2\rho\tau\theta u_2+\eta\mu^5\omega u_1+\eta\mu^4\omega\rho u_1$$
$$+\eta\mu^4\omega\theta u_1-\eta\mu^4\tau\theta u_2+\eta\mu^3\omega\rho\theta u_1-\eta\mu^3\rho\tau\theta u_2+\gamma^2\mu^4\omega u_1-2\gamma^2\mu^4\tau u_2+\gamma^2\mu^3\omega\rho u_1+\gamma^2\mu^3\omega\theta u_1-2\gamma^2\mu^3\rho\tau u_2$$
$$-3\gamma^2\mu^3\tau\theta u_2+\gamma^2\mu^2\omega\rho\theta u_1-3\gamma^2\mu^2\rho\tau\theta u_2+2\gamma\mu^5\omega u_1-2\gamma\mu^5\tau u_2+2\gamma\mu^4\omega\rho u_1+2\gamma\mu^4\omega\theta u_1-2\gamma\mu^4\rho\tau u_2$$
$$-4\gamma\mu^4\tau\theta u_2+2\gamma\mu^3\omega\rho\theta u_1-4\gamma\mu^3\rho\tau\theta u_2+\mu^6\omega u_1+\mu^5\omega\rho u_1+\mu^5\omega\theta u_1-\mu^5\tau\theta u_2+\mu^4\omega\rho\theta u_1-\mu^4\rho\tau\theta u_2$$
$$-\alpha^2\delta\eta\gamma\mu n-\alpha^2\delta\eta\gamma n\rho-\alpha^2\delta\eta\mu^2 n-\alpha^2\delta\eta\mu n\rho-\alpha^2\delta\gamma\mu^2 n-\alpha^2\delta\gamma\mu n\rho-\alpha^2\delta\mu^3 n-\alpha^2\delta\mu^2 n\rho-\alpha^2\eta\gamma\mu^2 n$$
$$-\alpha^2\eta\gamma\mu n\rho-\alpha^2\eta\mu^3 n-\alpha^2\eta\mu^2 n\rho-\alpha^2\gamma\mu^3 n-\alpha^2\gamma\mu^2 n\rho-\alpha^2\mu^4 n-\alpha^2\mu^3 n\rho+2\alpha\delta\eta\gamma^2\mu n+2\alpha\delta\eta\gamma^2 n\rho$$
$$+\alpha\delta\eta\gamma\mu^2 n+\alpha\delta\eta\gamma\mu n\rho-\alpha\delta\eta\gamma\mu n\theta-\alpha\delta\eta\gamma n\rho\theta-\alpha\delta\eta\mu^3 n-\alpha\delta\eta\mu^2 n\rho-\alpha\delta\eta\mu^2 n\theta-\alpha\delta\eta\mu n\rho\theta+\alpha\delta\gamma^2\mu^2 n$$
$$-2\alpha\eta\gamma\mu^2 n\theta-2\alpha\eta\gamma\mu n\rho\theta-\alpha\eta\mu^4 n-\alpha\eta\mu^3 n\rho-2\alpha\eta\mu^3 n\theta-2\alpha\eta\mu^2 n\rho\theta+\alpha\gamma^2\mu^3 n+\alpha\gamma^2\mu^2 n\rho-2\alpha\gamma\mu^3 n\theta$$
$$-2\alpha\gamma\mu^2 n\rho\theta-\alpha\mu^5 n-\alpha\mu^4 n\rho-2\alpha\mu^4 n\theta-2\alpha\mu^3 n\rho\theta-\delta\eta\gamma^2 m\mu\theta+2\delta\eta\gamma^2\mu^2 n+2\delta\eta\gamma^2\mu n\rho-2\delta\eta\gamma m\mu^2\theta$$
$$+2\delta\eta\gamma\mu^3 n+2\delta\eta\gamma\mu^2 n\rho-2\delta\eta\gamma\mu^2 n\theta-2\delta\eta\gamma\mu n\rho\theta-\delta\eta m\mu^3\theta-2\delta\eta\mu^3 n\theta-2\delta\eta\mu^2 n\rho\theta+\delta\gamma^2\mu^3 n+\delta\gamma^2\mu^2 n\rho$$
$$+\delta\gamma^2\mu^2 n\theta+\delta\gamma^2\mu n\rho\theta+\delta\gamma\mu^4 n+\delta\gamma\mu^3 n\rho-\delta\gamma\mu^2 n\theta^2-\delta\gamma\mu n\rho\theta^2-\delta\mu^4 n\theta-\delta\mu^3 n\rho\theta-\delta\mu^3 n\theta^2-\delta\mu^2 n\rho\theta^2$$
$$+\eta\gamma^2\mu^3 n+\eta\gamma^2\mu^2 n\rho+\eta\gamma^2\mu^2 n\theta+\eta\gamma^2\mu n\rho\theta+\eta\gamma\mu^4 n+\eta\gamma\mu^3 n\rho-\eta\gamma\mu^2 n\theta^2-\eta\gamma\mu n\rho\theta^2-\eta\mu^4 n\theta-\eta\mu^3 n\rho\theta$$
$$-\eta\mu^3 n\theta^2-\eta\mu^2 n\rho\theta^2+\gamma^2\mu^4 n+\gamma^2\mu^3 n\rho+\gamma^2\mu^3 n\theta+\gamma^2\mu^2 n\rho\theta+\gamma\mu^5 n+\gamma\mu^4 n\rho-\gamma\mu^3 n\theta^2-\gamma\mu^2 n\rho\theta^2-\mu^5 n\theta$$
$$-\mu^4 n\rho\theta-\mu^4 n\theta^2-\mu^3 n\rho\theta^2-\alpha\delta\eta\gamma^2\mu-\alpha\delta\eta\gamma^2\rho-2\alpha\delta\eta\gamma\mu^2-2\alpha\delta\eta\gamma\mu\rho-\alpha\delta\eta\mu^3-\alpha\delta\eta\mu^2\rho-\alpha\delta\gamma^2\mu^2$$
$$-\alpha\delta\gamma^2\mu\rho-2\alpha\delta\gamma\mu^3-2\alpha\delta\gamma\mu^2\rho-\alpha\delta\mu^4-\alpha\delta\mu^3\rho-\alpha\eta\gamma^2\mu^2-\alpha\eta\gamma^2\mu\rho-2\alpha\eta\gamma\mu^3-2\alpha\eta\gamma\mu^2\rho-\alpha\eta\mu^4$$
$$-\alpha\eta\mu^3\rho-\alpha\gamma^2\mu^3-\alpha\gamma^2\mu^2\rho-2\alpha\gamma\mu^4-2\alpha\gamma\mu^3\rho-\alpha\mu^5-\alpha\mu^4\rho-\delta\eta\gamma^2\mu^2-\delta\eta\gamma^2\mu\rho-2\delta\eta\gamma\mu^3-2\delta\eta\gamma\mu^2\rho$$
$$-\delta\eta\mu^4-\delta\eta\mu^3\rho-\delta\gamma^2\mu^3-\delta\gamma^2\mu^2\rho-\delta\gamma^2\mu^2\theta-\delta\gamma^2\mu\rho\theta-2\delta\gamma\mu^4-2\delta\gamma\mu^3\rho-2\delta\gamma\mu^3\theta-2\delta\gamma\mu^2\rho\theta-\delta\mu^5-\delta\mu^4\rho$$
$$-\delta\mu^4\theta-\delta\mu^3\rho\theta-\eta\gamma^2\mu^3-\eta\gamma^2\mu^2\rho-\eta\gamma^2\mu^2\theta-\eta\gamma^2\mu\rho\theta-2\eta\gamma\mu^4-2\eta\gamma\mu^3\rho-2\eta\gamma\mu^3\theta-2\eta\gamma\mu^2\rho\theta-\eta\mu^5$$
$$-\eta\mu^4\rho-\eta\mu^4\theta-\eta\mu^3\rho\theta-\gamma^2\mu^4-\gamma^2\mu^3\rho-\gamma^2\mu^3\theta-\gamma^2\mu^2\rho\theta-2\gamma\mu^5-2\gamma\mu^4\rho-2\gamma\mu^4\theta-2\gamma\mu^3\rho\theta-\mu^6-\mu^5\rho-\mu^5\theta$$
$$-\mu^4\rho\theta\big)\delta\beta\big)\Big\}$$

Lampiran 2. Syntax Simulasi Numerik Model Kontrol Optimal

Adapun *syntax* dalam aplikasi Matlab2015a yang digunakan untuk mencari solusi numerik model penyebaran penyakit difteri dibagi menjadi beberapa bentuk m file sebagai berikut:

MAIN.m

```
clear all;
clc;
global C1 C2 C3 C4 C5 A beta eta rho v w teta mu delta alpha gamma
omega tau
% Nilai parameter model
A=200;
beta=0.0000097;
eta=0.0001826;
%0.0002739726;
%;
rho=0.0001826;
%0.0002739726;
%0.0001826;
v=0.9;
w=0.8;
teta=0.071428;
mu=0.002;
delta=0.143;
alpha=0.0054;
gamma=0.00555; %asumsi jika orang tanpa gejala tak diobati bisa
jadi dia jadi kronis sampai 6 bulan
%efektivitas kontrol
omega=1;
%sigma=0.5;
tau=1;

%nilai bobot dalam fungsi ojektif
C1=1;
C2=1;
C3=1;
C4=1;
C5=1;

% Nilai awal state
x1awal=50000;
x2awal=100;
x3awal=25;
x4awal=75;
x5awal=1000;
x6awal=1000;
x0=[x1awal;x2awal;x3awal;x4awal;x5awal;x6awal];

nx=6;  %jumlahnya tergantung dari jumlah variabel atau kompartemen
lambdaT=zeros(nx,1);%Nilai akhir Costate (syarat transversalitas)
%Interval waktu
Ntime=1000; %partisi semakin banyak partisi maka semakin mulus
grafik yang diperoleh
tf=60;  %lamanya waktu pengamatan

ti=linspace(0,tf,Ntime);
%Batas kontrol
B1=0; %nilai kontrol terendah
```

```
B2=1; %nila kontrol tertinggi
nv=2; %jumlah tergantung pada jumlah kontrol yang diberikan dalam
model
BB=B1.*ones(nv,Ntime);
BA=B2.*ones(nv,Ntime);
%Parameter Sweep
test=-1;
deltaa=0.0001;
k=0;
%tebakan awal untuk fungsi kontrol u1, u2 dan biasanya tebakan
yang
%digunakan yaitu 0
u=0*ones(nv,Ntime);
%pemberian kontrol konstan pada
uk1=0.2*ones(nv,Ntime);
uk2=0.8*ones(nv,Ntime);
%solusi sistem tanpa kontrol (u1=0 u2=0)
options = odeset('AbsTol',1e-2,'RelTol',1e-2);
xnon=ode45(@(t,x) pers_state(t, x, u, ti),[0 tf],x0,options);
xnon=deval(xnon,ti);
%solusi sistem dengan kontrol konstan
xk1=ode45(@(t,x) pers_state(t, x, uk1, ti),[0 tf],x0,options);
xk1=deval(xk1,ti);
xk2=ode45(@(t,x) pers_state(t, x, uk2, ti),[0 tf],x0,options);
xk2=deval(xk2,ti);

%Awal Metode Sweep
x=zeros(nx,Ntime);
lambda=zeros(nx,Ntime);
while(test<0)
k=k+1;
oldx=x;
oldp=lambda;
oldu=u;
%Forward Runge Kutta dengan nila awal yang diketahui yaitu 0
x=deval(ode45(@(t,x) pers_state(t, x, u, ti), [0 tf], x0),ti);
%Backward Runge Kutta %yg digunakan nilai akhir lambdaT=0
lambda=deval(ode45(@(t,p) pers_costate(t, p, x, u, ti),[tf 0],
lambdaT),ti);
%menghitung nilai u dari syarat optimal sistem
u1=kontrol(x,lambda); %menggunakan u dH/du=0
%membuat u berada dalam interval yang diharapkan
u1=batas_kontrol(u1,BB,BA);
%mengupdate nilai u dalam metode sweep menggunakan kombinasi
konveks
u=0.5*(u1+oldu); %uji Konvergensi u yang pertama
%uji kekonvergensian jika telah memenuhi syarat konvergensi maka
iterasi
%akan dihentikan
temp1=deltaa*sum(abs(u))-sum(abs(oldu-u));
temp2=deltaa*sum(abs(x))-sum(abs(oldx-x));
temp3=deltaa*sum(abs(lambda))-sum(abs(oldp-lambda));
test=min(temp1,min(temp2,temp3)); %Buku Lenhart Hal:55
%menghitung nilai fungsi tujuan menggunakan u akhir
J(k)=fungsi_objektif(x,u,ti);
disp(['it: ',num2str(k),',Test: ', num2str(test)])
end
%menghitung nilai fungsi tujuan menggunakan u optimal
[m,n]=size(J);
```

```
Ju=fungsi_objektif(x,u,ti);

figure (1)
%subplot (121)
plot(ti,xnon(1,:),'r-',ti, x(1,:),'b-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('S(t)')
legend('Tanpa Kontrol', 'Kontrol Optimal')
axis('tight')
grid on
figure (2)
%subplot (122)
plot(ti,xnon(1,:),'r-',ti, x(1,:),'b-',ti, xk1(1,:),'g-',ti,
xk2(1,:),'m-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('S(t)')
legend('Tanpa Kontrol', 'Kontrol Optimal','Konstan 1','Konstan 1')
axis('tight')
grid on

figure (3)
subplot (321)
plot(ti,xnon(2,:),'r-','LineWidth',1.5)
xlabel('Waktu (hari) ')
ylabel('L(t)')
legend('Tanpa Kontrol')
axis('tight')
grid on
subplot (322)
plot(ti, x(2,:),'b-','LineWidth',1.5)
xlabel('Waktu (hari) ')
ylabel('L(t)')
legend( 'Kontrol Optimal')
axis('tight')
grid on
figure (4)
%subplot (222)
plot(ti,xnon(2,:),'r-',ti, x(2,:),'b-',ti, xk1(2,:),'g-',ti,
xk2(2,:),'m-','LineWidth',1.5)
xlabel('Waktu ')
ylabel('L(t)')
legend('Tanpa Kontrol', 'Kontrol Optimal','Konstan 1','Konstan 1')
axis('tight')
grid on

figure (5)
subplot (521)
plot(ti,xnon(3,:),'r-','LineWidth',1.5)
xlabel('Waktu (hari) ')
ylabel('I_s(t)')
legend('Tanpa Kontrol')
axis('tight')
grid on
subplot (522)
plot(ti, x(3,:),'b-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('I_s(t)')
legend( 'Kontrol Optimal')
```

```
axis('tight')
grid on
figure (6)
%subplot (321)
plot(ti,xnon(3,:),'r-',ti, x(3,:),'b-',ti, xk1(3,:),'g-',ti,
xk2(3,:),'m-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('I_s(t)')
legend('Tanpa Kontrol', 'Kontrol Optimal','Konstan 1','Konstan 2')
axis('tight')
grid on

figure (7)
subplot (721)
plot(ti,xnon(4,:),'r-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('I_a(t)')
legend('Tanpa Kontrol')
axis('tight')
grid on
subplot (722)
plot(ti, x(4,:),'b-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('I_a(t)')
legend( 'Kontrol Optimal')
axis('tight')
grid on
figure (8)
%subplot (422)
plot(ti,xnon(4,:),'r-',ti, x(4,:),'b-',ti, xk1(4,:),'g-',ti,
xk2(4,:),'m-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('I_a(t)')
legend('Tanpa Kontrol', 'Kontrol Optimal','Konstan 1','Konstan 2')
axis('tight')
grid on

figure (9)
%subplot (521)
plot(ti,xnon(5,:),'r-',ti, x(5,:),'b-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('R_f(t)')
legend('Tanpa Kontrol', 'Kontrol Optimal')
axis ('tight')
grid on
figure (10)
%subplot (522)
plot(ti,xnon(5,:),'r-',ti, x(5,:),'b-',ti, xk1(5,:),'g-',ti,
xk2(5,:),'m-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('R_f(t)')
legend('Tanpa Kontrol', 'Kontrol Optimal','Konstan 1','Konstan 2')
axis ('tight')
grid on
figure (11)
%subplot (621)
plot(ti,xnon(6,:),'r-',ti, x(6,:),'b-','LineWidth',1.5)
xlabel('Waktu (hari)')
```

```
ylabel('R_p(t)')
legend('Tanpa Kontrol', 'Kontrol Optimal')
axis ('tight')
grid on
figure (12)
%subplot (621)
plot(ti,xnon(6,:),'r-',ti, x(6,:),'b-',ti, xk1(6,:),'g-',ti,
xk2(6,:),'m-','LineWidth',1.5)
xlabel('Waktu (hari)')
ylabel('R_p(t)')
legend('Tanpa Kontrol', 'Kontrol Optimal','Konstan 1','Konstan 2')
axis ('tight')
grid on

%Fungsi Kontrol
figure (13)
plot(ti,u(1,:),'b-',ti,u(2,:),'m-','LineWidth',1.5)
legend('kontrol u_1 (Vaksinasi)','kontrol u_2(Pengobatan)')
xlabel('Waktu (hari)')
ylabel('u_1(t), u_2(t)')
title('Fungsi Kontrol')
axis('tight')
grid on
```

pers_state.m

```
function dx=pers_state(t, x, u, ti) %ti adalah inputan %t,x,u
adalah variabel
global A beta eta rho v w teta mu delta alpha gamma omega tau
%x1=S(t),x2=L(t),x3=Is(t),x4=Is(t),x5=Rf(t), dan x6=Rp(t)
x1=x(1);
x2=x(2);
x3=x(3);
x4=x(4);
x5=x(5);
x6=x(6);
u1=u(1,:);
u1=interp1(ti,u1',t);
u2=u(2,:);
u2=interp1(ti,u2',t);

dx=zeros(6,1);
dx(1)=A+eta.*x6-(1.-u1*omega)*beta.*x1.*(x3+x4)-(u1*omega+mu).*x1;
dx(2)=(1.-u1*omega)*beta.*x1.*(x3+x4)-(delta+mu).*x2;
dx(3)=(1-w)*delta.*x2-(1+u2*tau)*teta.*x3-(mu+alpha).*x3;
dx(4)=w.*delta.*x2-(1+u2*tau)*gamma.*x4-mu.*x4;
dx(5)=v*(1+u2*tau)*teta.*x3+u1.*x1-(rho+mu).*x5;
dx(6)=(1-v)*(1+u2*tau)*teta.*x3+(1+u2*tau)*gamma.*x4+rho.*x5-
(eta+mu).*x6;
end
```

pers_costate.m

```
function dlambda=pers_costate(t, lambda, x, u, ti)
global beta eta rho v teta w mu delta alpha gamma  C1 C2 C3 omega
tau
%x1=S(t),x2=L(t),x3=Is(t),x4=Is(t),x5=Rf(t), dan x6=Rp(t)
x = interp1(ti,x',t);
x1 = x(1);
x2 = x(2);
```

```
x3 = x(3);
x4 = x(4);
x5 = x(5);
x6 = x(6);
u1 = u(1,:);
u2 = u(2,:);

u1 = interp1(ti,u1',t);
u2 = interp1(ti,u2',t);

lambda1=lambda(1,:);
lambda2=lambda(2,:);
lambda3=lambda(3,:);
lambda4=lambda(4,:);
lambda5=lambda(5,:);
lambda6=lambda(6,:);

dlambda=zeros(6,1);
dlambda(1)=(lambda1-lambda2)*(1-u1*omega)*beta.*(x3+x4)+(lambda1-
lambda2)*u1*omega+lambda1*mu;
dlambda(2)=-C1+(lambda2-lambda3*(1-w)-lambda4*w)*delta+lambda2*mu;
dlambda(3)=-C2+(lambda1-lambda2)*(1-u1*omega)*beta.*x1+(lambda3-
lambda5*v-lambda6*(1-v))*(1+u2*tau)*teta+lambda3*(alpha+mu);
dlambda(4)=-C3+(lambda1-lambda2)*(1-u1*omega)*beta.*x1+(lambda4-
lambda6)*(1+u2*tau)*gamma+lambda4*mu;
dlambda(5)=(lambda5-lambda6)*rho+lambda5*mu;
dlambda(6)=(lambda6-lambda1)*eta+lambda6*mu;
end
```

batas_kontrol.m

```
function s=batas_kontrol(s,BB,BA)
% untuk batas bawah
ns_tmp=s;
I=ns_tmp<BB;
ns_tmp(I)=BB(I);
% untuk batas atas
J=ns_tmp>BA;
ns_tmp(J)=BA(J);
% Update u
s=ns_tmp;
end
```

kontrol.m

```
function u= kontrol(x,lambda)
global C4 C5 v beta gamma  teta omega tau
lambda1 = lambda(1,:);
lambda2 = lambda(2,:);
lambda3 = lambda(3,:);
lambda4 = lambda(4,:);
lambda5 = lambda(5,:);
lambda6 = lambda(6,:);
x1 = x(1,:);
x2 = x(2,:);
x3 = x(3,:);
x4 = x(4,:);
x5 = x(5,:);
x6 = x(6,:);
%fungsi kontrol:
```

```
u1=((lambda2-lambda1)*omega*beta.*x1.*(x3+x4)+(lambda1-
lambda5)*omega.*x1)/C4;
u2=((lambda3-lambda5*v-lambda6*(1-v))*tau*teta.*x3+(lambda4-
lambda6)*tau*gamma.*x4)/C5;
u=[u1;u2];
end
```

fungsi_objektif.m

```
function J= fungsi_objektif(x,u,ti)
global C1 C2 C3 C4 C5
x2=x(2,:);
x3=x(3,:);
x4=x(4,:);
x5=x(2,:);
x6=x(2,:);
u1=u(1,:);
u2=u(2,:);
obj=C1.*x2+C2.*x3+C3.*x4+(C4/2).*u1.^2+(C5/2).*u2.^2;
J=trapz(ti,obj);
end
```