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# LAMPIRAN

**Lampiran 1.** Data Indeks Pembangunan Manusia dan Faktor-Faktor yang Mempengaruhi di Provinsi Sulawesi Selatan Tahun 2010-2019

| Kab/Kota | Tahun | IPM | RLS | HLS | PPP | AHH |
|---|---|---|---|---|---|---|
| Kep. Selayar | 2010 | 62,15 | 6,66 | 11,58 | 7,311 | 67,40 |
| Kep. Selayar | 2011 | 62,53 | 6,74 | 11,68 | 7,423 | 67,43 |
| Kep. Selayar | 2012 | 62,87 | 6,82 | 11,78 | 7,506 | 67,47 |
| Kep. Selayar | 2013 | 63,16 | 6,90 | 11,88 | 7,564 | 67,49 |
| Kep. Selayar | 2014 | 63,66 | 7,10 | 11,98 | 7,656 | 67,50 |
| Kep. Selayar | 2015 | 64,32 | 7,16 | 12,29 | 7,793 | 67,70 |
| Kep. Selayar | 2016 | 64,95 | 7,17 | 12,44 | 8,123 | 67,76 |
| Kep. Selayar | 2017 | 65,39 | 7,18 | 12,45 | 8,436 | 67,82 |
| Kep. Selayar | 2018 | 66,04 | 7,63 | 12,48 | 8,666 | 67,47 |
| Kep. Selayar | 2019 | 67,38 | 7,88 | 12,65 | 9,028 | 68,46 |
| Bulukumba | 2010 | 62,73 | 6,58 | 10,79 | 9,022 | 66,15 |
| Bulukumba | 2011 | 63,36 | 6,59 | 11,21 | 9,127 | 66,23 |
| Bulukumba | 2012 | 63,82 | 6,61 | 11,56 | 9,136 | 66,31 |
| Bulukumba | 2013 | 64,27 | 6,63 | 11,91 | 9,145 | 66,39 |
| Bulukumba | 2014 | 65,24 | 6,66 | 12,31 | 9,618 | 66,43 |
| Bulukumba | 2015 | 65,58 | 6,68 | 12,32 | 9,777 | 66,73 |
| Bulukumba | 2016 | 66,46 | 6,86 | 12,64 | 10,040 | 66,84 |
| Bulukumba | 2017 | 67,08 | 7,16 | 12,65 | 10,217 | 66,96 |
| Bulukumba | 2018 | 67,70 | 7,43 | 12,91 | 10,331 | 66,31 |
| Bulukumba | 2019 | 68,99 | 7,67 | 13,17 | 10,480 | 67,92 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| Palopo | 2010 | 73,03 | 9,77 | 13,03 | 11,252 | 69,94 |
| Palopo | 2011 | 74,02 | 9,83 | 13,84 | 11,372 | 70,00 |
| Palopo | 2012 | 74,54 | 9,89 | 14,16 | 11,493 | 70,05 |
| Palopo | 2013 | 75,02 | 9,95 | 14,49 | 11,590 | 70,10 |
| Palopo | 2014 | 75,65 | 9,96 | 15,01 | 11,713 | 70,12 |
| Palopo | 2015 | 76,27 | 10,25 | 15,02 | 12,005 | 70,20 |
| Palopo | 2016 | 76,45 | 10,26 | 15,03 | 12,156 | 70,25 |
| Palopo | 2017 | 76,71 | 10,33 | 15,05 | 12,319 | 70,30 |
| Palopo | 2018 | 77,30 | 10,75 | 15,07 | 12,662 | 70,05 |
| Palopo | 2019 | 78,06 | 10,76 | 15,08 | 12,986 | 70,88 |

**Lampiran 2.** Hasil *Output* Penentuan Variabel Komponen Parametrik dan Nonparametrik

```
> #Menentukan komponen parametrik dan nonparametrik
> #1 Scatterplot
> plot(X1,Y, xlab = "RLS",ylab = "IPM",abline(lm(Y~X1),col="red"))
> plot(X2,Y, xlab = "HLS",ylab = "IPM",abline(lm(Y~X2),col="red"))
> plot(X3,Y, xlab = "PPP",ylab = "IPM",abline(lm(Y~X3),col="red"))
> plot(Z1,Y, xlab = "AHH",ylab = "IPM",abline(lm(Y~Z1),col="red"))
> plot(t,Y, xlab = "Tahun",ylab = "IPM",abline(lm(Y~t),col="red"))
> #2 Koefisien Determinasi
> regresi<-function(x,y)
+ {
+   X<-cbind(1,x)
+   Beta<-(solve(t(X)%*%X))%*%(t(X)%*%y)
+   ytopi<-X%*%Beta
+   ybar<-sum(Y)/N
+   JKE<-t(y-ytopi)%*%(y-ytopi)
+   JKT<-t(y-ybar)%*%(y-ybar)
+   JKR<-t(ytopi-ybar)%*%(ytopi-ybar)
+   Rsquare<-JKR/JKT
+   return(Rsquare)
+ }
> regresi(X1,Y)
          [,1]
[1,] 0.8718362
> regresi(X2,Y)
          [,1]
[1,] 0.7509802
> regresi(X3,Y)
        [,1]
[1,] 0.56059
> regresi(Z,Y)
          [,1]
[1,] 0.3068552
> regresi(t,Y)
          [,1]
[1,] 0.1406852
> reg<-cbind(regresi(X1,Y),regresi(X2,Y),regresi(X3,Y),regresi(Z1,Y),regresi(t,Y))
> Hasil=matrix(0,5,1)
> keputusan=matrix(0.5,5,1)
> for(i in 1:5){
+   if((reg[i])>keputusan[i]){
+     Hasil[i]="Parametrik"
+   }else
+     Hasil[i]="Non Parametrik"
+ }
> Hasil
     [,1]
[1,] "Parametrik"
[2,] "Parametrik"
[3,] "Parametrik"
[4,] "Non Parametrik"
[5,] "Non Parametrik"
```

**Lampiran 3.** Hasil *Output* Basis *B-spline* Optimal pada Orde Kuadratik dengan Dua Titik Knot $u_1 = 2012$ dan $u_2 = 2017$

| No | $B_{-2,3}$ | $B_{-1,3}$ | $B_{0,3}$ | $B_{1,3}$ | $B_{2,3}$ |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0.25 | 0.67857143 | 0.07142857 | 0 | 0 |
| 3 | 0 | 0.71428571 | 0.28571429 | 0 | 0 |
| 4 | 0 | 0.45714286 | 0.51428571 | 0.02857143 | 0 |
| 5 | 0 | 0.25714286 | 0.62857143 | 0.11428571 | 0 |
| 6 | 0 | 0.11428571 | 0.62857143 | 0.25714286 | 0 |
| 7 | 0 | 0.02857143 | 0.51428571 | 0.45714286 | 0 |
| 8 | 0 | 0 | 0.28571429 | 0.71428571 | 0 |
| 9 | 0 | 0 | 0.07142857 | 0.67857143 | 0.25 |
| 10 | 0 | 0 | 0 | 0 | 1 |
| 11 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0.25 | 0.67857143 | 0.07142857 | 0 | 0 |
| 13 | 0 | 0.71428571 | 0.28571429 | 0 | 0 |
| 14 | 0 | 0.45714286 | 0.51428571 | 0.02857143 | 0 |
| 15 | 0 | 0.25714286 | 0.62857143 | 0.11428571 | 0 |
| 16 | 0 | 0.11428571 | 0.62857143 | 0.25714286 | 0 |
| 17 | 0 | 0.02857143 | 0.51428571 | 0.45714286 | 0 |
| 18 | 0 | 0 | 0.28571429 | 0.71428571 | 0 |
| 19 | 0 | 0 | 0.07142857 | 0.67857143 | 0.25 |
| 20 | 0 | 0 | 0 | 0 | 1 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 231 | 0 | 0 | 0 | 0 | 0 |
| 232 | 0.25 | 0.67857143 | 0.07142857 | 0 | 0 |
| 233 | 0 | 0.71428571 | 0.28571429 | 0 | 0 |
| 234 | 0 | 0.45714286 | 0.51428571 | 0.02857143 | 0 |
| 235 | 0 | 0.25714286 | 0.62857143 | 0.11428571 | 0 |
| 236 | 0 | 0.11428571 | 0.62857143 | 0.25714286 | 0 |
| 237 | 0 | 0.02857143 | 0.51428571 | 0.45714286 | 0 |
| 238 | 0 | 0 | 0.28571429 | 0.71428571 | 0 |
| 239 | 0 | 0 | 0.07142857 | 0.67857143 | 0.25 |
| 240 | 0 | 0 | 0 | 0 | 1 |

**Lampiran 4.** Sintaks Program R untuk *B-Spline* Optimal pada Orde Kuadratik dengan Dua Titik Knot

```
#Aplikasi Model Semiparametrik pada Data IPM
Data<-read.csv(file.choose(), header = TRUE)

#Mendefinisikan variabel penelitian
Y<-Data[,3]
X1<-Data[,4] #parametrik
X2<-Data[,5] #parametrik
X3<-Data[,7] #parametrik
Z1<-Data[,6] #nonparametrik
t<-Data[,2]
N<-length(Y)

#Mendekati Komponen Nonparametrik dengan B-spline Koefisien Bervariasi#
B2<-splines2::bSpline(t,knots = c(2012,2017), degree = 3L)
VC2<-Z1*B2
A2<-matrix(0, ncol = 7, nrow = N)
A2[,1]<-t
A2[,2]<-t^2
A2[,3:7]<-B2

TVC2<-(t(VC2)%*%VC2)
VC2INV<-mpi(TVC2)
VC2Y<-t(VC2)%*%Y
Alpa2<-VC2INV%*%VC2Y
flamda2<-VC2%*%Alpa2
MSE2<-(t(Y-flamda2)%*%(Y-flamda2))/N
Aknot2<-(A2%*%mpi(t(A2)%*%A2)%*%t(A2))
GCV2<-MSE2/(1-((1/N)*sum(diag(Aknot2))))^2
GCV2

#Estimasi model Semiparametrik dengan Koefisien Bervariasi#
SVC<-matrix(0, ncol=9, nrow = N)
SVC[,1]<-1
SVC[,2]<-X1
SVC[,3]<-X2
SVC[,4]<-X3
SVC[,5:9]<-VC2
#Estimasi
TSVC<-t(SVC)%*%SVC
SVCINV<-solve(TSVC)
SVCINV
SVCY<-t(SVC)%*%Y
Betaalpa<-SVCINV%*%SVCY
Betaalpa
```