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LAMPIRAN

Lampiran 1. Perhitungan spektrum gelombang JONSWAP

Lokasi: Batam

Gravity [m/s^2]	Mean wave period [s]	Angular Frequency (ω)	Significant Height of Waves [m]	ωo	S(ω) [mm^2/s]
9,81	6,154	1,021	1,776	0,173	0,101
9,81	5,904	1,046	1,776	0,173	0,122
9,81	5,674	1,049	1,776	0,173	0,137
9,81	5,497	1,053	1,776	0,173	0,145
9,81	5,338	1,064	1,776	0,173	0,150
9,81	5,216	1,080	1,776	0,173	0,152
9,81	5,130	1,080	1,776	0,173	0,152
9,81	5,017	1,092	1,776	0,173	0,151
9,81	4,853	1,103	1,776	0,173	0,147
9,81	4,638	1,107	1,776	0,173	0,138
9,81	4,539	1,109	1,776	0,173	0,133
9,81	4,410	1,110	1,776	0,173	0,125
9,81	4,350	1,143	1,776	0,173	0,121
9,81	4,203	1,162	1,776	0,173	0,110
9,81	4,195	1,167	1,776	0,173	0,110
9,81	3,961	1,173	1,776	0,173	0,092
9,81	3,920	1,177	1,776	0,173	0,089
9,81	3,773	1,188	1,776	0,173	0,078
9,81	3,644	1,188	1,776	0,173	0,069
9,81	3,426	1,190	1,776	0,173	0,054
9,81	3,330	1,192	1,776	0,173	0,048
9,81	3,166	1,192	1,776	0,173	0,039
9,81	3,044	1,196	1,776	0,173	0,033
9,81	2,928	1,197	1,776	0,173	0,028
9,81	2,789	1,200	1,776	0,173	0,022
9,81	2,744	1,201	1,776	0,173	0,021
9,81	2,648	1,201	1,776	0,173	0,017
9,81	2,644	1,205	1,776	0,173	0,017
9,81	2,600	1,207	1,776	0,173	0,016
9,81	2,537	1,209	1,776	0,173	0,014
9,81	2,481	1,209	1,776	0,173	0,013
9,81	2,475	1,214	1,776	0,173	0,013
9,81	2,467	1,215	1,776	0,173	0,012
9,81	2,424	1,216	1,776	0,173	0,011
9,81	2,410	1,216	1,776	0,173	0,011

Lanjutan lampiran 1. Perhitungan spektrum gelombang JONSWAP

Gravity [m/s^2]	Mean wave period [s]	Angular Frequency (ω)	Significant Height of Waves [m]	ωo	S(ω) [mm^2/s]
9,81	2,370	1,219	1,776	0,173	0,010
9,81	2,265	1,222	1,776	0,173	0,008
9,81	2,234	1,225	1,776	0,173	0,008
9,81	2,228	1,225	1,776	0,173	0,008
9,81	2,143	1,225	1,776	0,173	0,006
9,81	1,976	1,227	1,776	0,173	0,004
9,81	1,961	1,228	1,776	0,173	0,004

Lampiran 2. Perhitungan *Response Amplitude Operator* (RAO)

ω [rad/s]	σ [N/mm²]	Hs [m]	RAO [(N/mm²)/m]
1,02	18,99	1,78	10,69
1,06	77,69	1,78	43,74
1,11	88,93	1,78	50,08
1,14	97,31	1,78	54,79
1,18	108,69	1,78	61,20
1,20	108,93	1,78	61,33
1,22	114,25	1,78	64,33
1,25	116,85	1,78	65,79
1,29	128,98	1,78	72,62
1,35	141,37	1,78	79,60
1,38	164,95	1,78	92,88
1,42	166,49	1,78	93,74
1,44	172,92	1,78	97,37
1,49	199,74	1,78	112,46
1,50	217,30	1,78	122,35
1,59	218,24	1,78	122,88
1,60	221,29	1,78	124,60
1,67	221,56	1,78	124,75
1,72	235,85	1,78	132,80
1,83	246,31	1,78	138,69
1,89	264,23	1,78	148,78
1,98	271,73	1,78	153,00
2,06	296,73	1,78	167,08
2,15	296,73	1,78	167,08
2,25	307,42	1,78	173,10
2,29	309,77	1,78	174,42
2,37	311,73	1,78	175,52

Lanjutan lampiran 2. Perhitungan *Response Amplitude Operator* (RAO)

ω [rad/s]	σ [N/mm²]	Hs [m]	RAO [(N/mm²)/m]
2,38	315,87	1,78	177,86
2,42	318,39	1,78	179,27
2,48	321,24	1,78	180,88
2,53	322,25	1,78	181,44
2,54	325,90	1,78	183,50
2,55	331,58	1,78	186,70
2,59	354,21	1,78	199,44
2,61	360,22	1,78	202,82
2,65	362,56	1,78	204,14
2,77	365,13	1,78	205,59
2,81	366,77	1,78	206,51
2,82	369,61	1,78	208,11
2,93	379,49	1,78	213,68
3,18	380,21	1,78	214,08
3,20	419,44	1,78	236,17

Lampiran 3. Perhitungan *Stress Response Spectra*

ω [rad/s]	RAO [(N/mm²)/m]	S(ω) [mm²/s]	Sr(ω) [mm²/s]
1,02	10,69	0,10	11,59
1,06	43,74	0,12	232,53
1,11	50,08	0,14	342,86
1,14	54,79	0,15	435,99
1,18	61,20	0,15	561,93
1,20	61,33	0,15	570,98
1,22	64,33	0,15	628,95
1,25	65,79	0,15	653,51
1,29	72,62	0,15	775,61
1,35	79,60	0,14	874,43
1,38	92,88	0,13	1143,70
1,42	93,74	0,12	1094,91
1,44	97,37	0,12	1143,11
1,49	112,46	0,11	1393,43
1,50	122,35	0,11	1640,44
1,59	122,88	0,09	1389,98
1,60	124,60	0,09	1381,00

Lanjutan lampiran 3. Perhitungan *Perhitungan Stress Response Spectra*

ω [rad/s]	RAO [(N/mm²)/m]	S(ω) [mm²/s]	Sr(ω) [mm²/s]
1,67	124,75	0,08	1213,49
1,72	132,80	0,07	1210,73
1,83	138,69	0,05	1038,69
1,89	148,78	0,05	1064,58
1,98	153,00	0,04	910,20
2,06	167,08	0,03	915,20
2,15	167,08	0,03	770,31
2,25	173,10	0,02	663,42
2,29	174,42	0,02	625,17
2,37	175,52	0,02	536,97
2,38	177,86	0,02	547,48
2,42	179,27	0,02	514,36
2,48	180,88	0,01	466,70
2,53	181,44	0,01	422,67
2,54	183,50	0,01	427,38
2,55	186,70	0,01	435,68
2,59	199,44	0,01	457,37
2,61	202,82	0,01	460,16
2,65	204,14	0,01	430,40
2,77	205,59	0,01	351,26
2,81	206,51	0,01	331,66
2,82	208,11	0,01	332,47
2,93	213,68	0,01	290,36
3,18	214,08	0,00	196,29
3,20	236,17	0,00	230,15

Lampiran 4. Perhitungan *Zero Moment*

ω [rad/s]	Sr(ω) [mm²/s]	Faktor Simpson	Sr(ω) x FS
0	0	1	0
0,1	0	4	0
0,2	0	2	0
0,3	0	4	0
0,4	0	2	0
0,5	0	4	0
0,6	0	2	0
0,7	0	4	0
0,8	0	2	0
0,9	0	4	0

Lanjutan lampiran 4. Perhitungan *Perhitungan Zero Moment*

ω [rad/s]	Sr(ω) [mm²/s]	Faktor Simpson	Sr(ω) x FS
1	11,59	2	23,18
1,1	342,86	4	1371,45
1,2	570,98	2	1141,96
1,3	775,61	4	3102,44
1,4	1143,11	2	2286,22
1,5	1640,44	4	6561,78
1,6	1381,00	2	2761,99
1,7	1210,73	4	4842,90
1,8	1038,69	2	2077,37
1,9	910,20	4	3640,80
2	915,20	2	1830,40
2,1	770,31	4	3081,23
2,2	663,42	2	1326,84
2,3	625,17	4	2500,70
2,4	514,36	2	1028,72
2,5	422,67	4	1690,70
2,6	460,16	2	920,32
2,7	351,26	4	1405,04
2,8	331,66	2	663,32
2,9	332,47	4	1329,87
3	290,36	2	580,73
3,1	196,29	4	785,17
3,2	230,15	1	230,15
∑			45183,29
Luasan			1506,11

Lampiran 5. Perhitungan *Second Moment*

ω [rad/s]	Sr(ω) [mm²/s]	Sr(ω) x ω²	Faktor Simpson	Sr(ω) x ω² x FS
0	0	0	1	0
0,1	0	0	4	0
0,2	0	0	2	0
0,3	0	0	4	0
0,4	0	0	2	0
0,5	0	0	4	0
0,6	0	0	2	0
0,7	0	0	4	0
0,8	0	0	2	0
0,9	0	0	4	0

Lanjutan lampiran 5. Perhitungan *Second Moment*

ω [rad/s]	Sr(ω) [mm²/s]	Sr(ω) x ω²	Faktor Simpson	Sr(ω) x ω² x FS
1	11,59	11,59	2	23,18
1,1	342,86	414,86	4	1659,45
1,2	570,98	822,21	2	1644,42
1,3	775,61	1310,78	4	5243,12
1,4	1143,11	2240,50	2	4480,99
1,5	1640,44	3691,00	4	14764,00
1,6	1381,00	3535,35	2	7070,70
1,7	1210,73	3499,00	4	13995,99
1,8	1038,69	3365,35	2	6730,69
1,9	910,20	3285,82	4	13143,30
2	915,20	3660,80	2	7321,60
2,1	770,31	3397,06	4	13588,23
2,2	663,42	3210,96	2	6421,93
2,3	625,17	3307,17	4	13228,68
2,4	514,36	2962,73	2	5925,45
2,5	422,67	2641,71	4	10566,85
2,6	460,16	3110,69	2	6221,37
2,7	351,26	2560,69	4	10242,77
2,8	331,66	2600,22	2	5200,44
2,9	332,47	2796,05	4	11184,22
3	290,36	2613,28	2	5226,56
3,1	196,29	1886,37	4	7545,48
3,2	230,15	2356,77	1	2356,77
∑				173786,18
Luasan				5792,87

BIODATA MAHASISWA

A. Mahasiswa

Nama Lengkap : Andri
Stambuk : D081 18 1009
Jenis Kelamin : Laki-laki
Tempat /Tanggal Lahir : Tontonan, 02 Januari 2001
Agama : Islam
Alamat Rumah : Jl. Manggis, Kecamatan Bontomarannu, Gowa, Sulawesi Selatan

B. Perguruan Tinggi

Perguruan Tinggi : Universitas Hasanuddin
Alamat Perguruan Tinggi : Departemen Teknik Kelautan FT-UH Kampus II Fakultas Teknik Universitas Hasanuddin, Jl. Poros Malino, Km. 06, Kec. Bontomarannu, Kab. Gowa.

C. Orang Tua

Nama Ayah : Jasman
Pekerjaan Ayah : Petani
Nama Ibu : Rubia
Pekerjaan Ibu : Ibu Rumah Tangga

D. Riwayat Pendidikan

2006-2011 : Madrasah Ibtidai'ya Tontonan
2011-2015 : SMP Negeri 1 Anggeraja
2015-2018 : SMA Negeri 1 Enrekang
2018-2022 : Universitas Hasanuddin