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LAMPIRAN

Lampiran 1. Data Produksi Gandum Tahunan (1982 – 2022)
Australia

Year	Item	Area	Yield
1982	Wheat	Australia	7705
1983	Wheat	Australia	17026
1984	Wheat	Australia	15455
1985	Wheat	Australia	13695
1986	Wheat	Australia	14476
1987	Wheat	Australia	13645
1988	Wheat	Australia	15787
1989	Wheat	Australia	15787
1990	Wheat	Australia	16344
1991	Wheat	Australia	16344
1992	Wheat	Australia	14698
1993	Wheat	Australia	17812
1994	Wheat	Australia	19658
1995	Wheat	Australia	11356
1996	Wheat	Australia	17899
1997	Wheat	Australia	21673
1998	Wheat	Australia	18412
1999	Wheat	Australia	18596
2000	Wheat	Australia	20066
2001	Wheat	Australia	18209
2002	Wheat	Australia	21076
2003	Wheat	Australia	9070
2004	Wheat	Australia	19998
2005	Wheat	Australia	16348
2006	Wheat	Australia	20213
2007	Wheat	Australia	9173
2008	Wheat	Australia	10788
2009	Wheat	Australia	15831
2010	Wheat	Australia	15729
2011	Wheat	Australia	20301
2012	Wheat	Australia	21511
2013	Wheat	Australia	17609
2014	Wheat	Australia	20061

2015	Wheat	Australia	19172
2016	Wheat	Australia	19743
2017	Wheat	Australia	26100
2018	Wheat	Australia	19178
2019	Wheat	Australia	16917
2020	Wheat	Australia	14681
2021	Wheat	Australia	25249
2022	Wheat	Australia	28470

Argentina

Year	Item	Area	Yield
1982	Wheat	Argentina	20501
1983	Wheat	Argentina	18405
1984	Wheat	Argentina	23068
1985	Wheat	Argentina	16177
1986	Wheat	Argentina	17819
1987	Wheat	Argentina	18847
1988	Wheat	Argentina	18344
1989	Wheat	Argentina	18947
1990	Wheat	Argentina	18947
1991	Wheat	Argentina	18972
1992	Wheat	Argentina	21809
1993	Wheat	Argentina	23272
1994	Wheat	Argentina	20237
1995	Wheat	Argentina	21675
1996	Wheat	Argentina	19344
1997	Wheat	Argentina	22426
1998	Wheat	Argentina	26088
1999	Wheat	Argentina	23028
2000	Wheat	Argentina	24873
2001	Wheat	Argentina	24934
2002	Wheat	Argentina	22398
2003	Wheat	Argentina	20361
2004	Wheat	Argentina	25441
2005	Wheat	Argentina	26356
2006	Wheat	Argentina	25302
2007	Wheat	Argentina	26234
2008	Wheat	Argentina	28271

2009	Wheat	Argentina	19628
2010	Wheat	Argentina	27113
2011	Wheat	Argentina	35063
2012	Wheat	Argentina	32199
2013	Wheat	Argentina	26581
2014	Wheat	Argentina	26619
2015	Wheat	Argentina	28100
2016	Wheat	Argentina	28623
2017	Wheat	Argentina	33047
2018	Wheat	Argentina	31806
2019	Wheat	Argentina	32160
2020	Wheat	Argentina	29387
2021	Wheat	Argentina	27595
2022	Wheat	Argentina	33825

Kanada

Year	Item	Area	Yield
1982	Wheat	Canada	21336
1983	Wheat	Canada	19345
1984	Wheat	Canada	16099
1985	Wheat	Canada	17665
1986	Wheat	Canada	22052
1987	Wheat	Canada	19279
1988	Wheat	Canada	12293
1989	Wheat	Canada	18076
1990	Wheat	Canada	22769
1991	Wheat	Canada	22559
1992	Wheat	Canada	21603
1993	Wheat	Canada	22027
1994	Wheat	Canada	21275
1995	Wheat	Canada	22467
1996	Wheat	Canada	24304
1997	Wheat	Canada	21285
1998	Wheat	Canada	22550
1999	Wheat	Canada	25971
2000	Wheat	Canada	24446
2001	Wheat	Canada	19452
2002	Wheat	Canada	18324

2003	Wheat	Canada	22565
2004	Wheat	Canada	26409
2005	Wheat	Canada	27381
2006	Wheat	Canada	26096
2007	Wheat	Canada	23317
2008	Wheat	Canada	28575
2009	Wheat	Canada	27897
2010	Wheat	Canada	28085
2011	Wheat	Canada	29568
2012	Wheat	Canada	28743
2013	Wheat	Canada	35980
2014	Wheat	Canada	30818
2015	Wheat	Canada	28925
2016	Wheat	Canada	35805
2017	Wheat	Canada	33815
2018	Wheat	Canada	32742
2019	Wheat	Canada	33834
2020	Wheat	Canada	35374
2021	Wheat	Canada	24375
2022	Wheat	Canada	34056

Lampiran 2. Data Indeks *Madden Julian Oscillation* (MJO)
Data Raw

Year	Amplitudo
Jan-82	0.992
Feb-82	0.955
Mar-82	0.826
Apr-82	1.148
May-82	1.406
Jun-82	1.088
Jul-82	0.822
Aug-82	0.848
Sep-82	0.867
Oct-82	0.896
Nov-82	1.459
Dec-82	1.125
Jan-83	1.117
Feb-83	0.909
Mar-83	0.787
Apr-83	1.056
May-83	0.862
Jun-83	1.065
Jul-83	0.889
Aug-83	1.187
Sep-83	1.502
Oct-83	1.145
Nov-83	1.262
Dec-83	1.114
Jan-84	1.197
Feb-84	0.971
Mar-84	1.115
Apr-84	0.988
May-84	0.599
Jun-84	0.940
Jul-84	1.080
Aug-84	1.602
Sep-84	1.063
Oct-84	1.299
Nov-84	2.109
Dec-84	1.085
Jan-85	1.549
Feb-85	3.044
Mar-85	1.448
Apr-85	1.242
May-85	1.008
Jun-85	1.351
Jul-85	0.669
Aug-85	0.479
Sep-85	0.540
Oct-85	1.432
Nov-85	1.631
Dec-85	0.749
Jan-86	2.387
Feb-86	0.894
Mar-86	2.246
Apr-86	1.143
May-86	1.715
Jun-86	1.575
Jul-86	0.912
Aug-86	1.544
Sep-86	1.243
Oct-86	1.022
Nov-86	1.917
Dec-86	0.933
Jan-87	1.003
Feb-87	1.459
Mar-87	1.661
Apr-87	1.151
May-87	1.407
Jun-87	1.224
Jul-87	1.093
Aug-87	1.933
Sep-87	1.235
Oct-87	0.926
Nov-87	1.797
Dec-87	1.561
Jan-88	1.374
Feb-88	1.993
Mar-88	2.815
Apr-88	1.966
May-88	1.209
Jun-88	0.983
Jul-88	0.808
Aug-88	1.101
Sep-88	1.271
Oct-88	1.571
Nov-88	0.699
Dec-88	0.842
Jan-89	1.841
Feb-89	1.035
Mar-89	1.189
Apr-89	1.525
May-89	1.263
Jun-89	0.811
Jul-89	1.131
Aug-89	0.562
Sep-89	1.106
Oct-89	1.229
Nov-89	1.117
Dec-89	1.317
Jan-90	2.038
Feb-90	1.558
Mar-90	2.314
Apr-90	1.812
May-90	1.421
Jun-90	0.704
Jul-90	0.764
Aug-90	0.880
Sep-90	0.776
Oct-90	1.420
Nov-90	1.425
Dec-90	1.332
Jan-91	1.194

Feb-91	1.228
Mar-91	1.228
Apr-91	1.265
May-91	1.303
Jun-91	1.184
Jul-91	1.103
Aug-91	1.333
Sep-91	1.373
Oct-91	1.178
Nov-91	0.924
Dec-91	1.688
Jan-92	1.714
Feb-92	1.090
Mar-92	1.511
Apr-92	1.306
May-92	0.957
Jun-92	1.031
Jul-92	1.032
Aug-92	0.793
Sep-92	1.128
Oct-92	1.240
Nov-92	1.153
Dec-92	0.755
Jan-93	2.546
Feb-93	1.236
Mar-93	1.155
Apr-93	0.760
May-93	0.966
Jun-93	1.513
Jul-93	0.850
Aug-93	0.934
Sep-93	0.465
Oct-93	1.039
Nov-93	1.348
Dec-93	1.159
Jan-94	0.724
Feb-94	2.139
Mar-94	0.748
Apr-94	0.693
May-94	1.686
Jun-94	0.944
Jul-94	0.977
Aug-94	0.601
Sep-94	1.638
Oct-94	1.355
Nov-94	1.342
Dec-94	1.542
Jan-95	1.406
Feb-95	1.051
Mar-95	1.476
Apr-95	1.307
May-95	1.553
Jun-95	0.839
Jul-95	1.397
Aug-95	1.332
Sep-95	1.013
Oct-95	0.696
Nov-95	1.378
Dec-95	1.358
Jan-96	0.868
Feb-96	0.755
Mar-96	1.840
Apr-96	1.032
May-96	1.608
Jun-96	1.577
Jul-96	1.590
Aug-96	1.009
Sep-96	1.061
Oct-96	0.903
Nov-96	1.749
Dec-96	2.181
Jan-97	1.229
Feb-97	2.014
Mar-97	3.154
Apr-97	1.517
May-97	1.860
Jun-97	2.074
Jul-97	1.455
Aug-97	0.639
Sep-97	0.664
Oct-97	0.833
Nov-97	1.104
Dec-97	1.120
Jan-98	1.119
Feb-98	1.098
Mar-98	0.743
Apr-98	0.971
May-98	2.008
Jun-98	0.921
Jul-98	0.754
Aug-98	1.005
Sep-98	1.422
Oct-98	1.201
Nov-98	1.537
Dec-98	0.731
Jan-99	1.417
Feb-99	1.667
Mar-99	1.395
Apr-99	1.152
May-99	1.234
Jun-99	1.343
Jul-99	0.888
Aug-99	0.822
Sep-99	1.224
Oct-99	1.131
Nov-99	1.410
Dec-99	1.187
Jan-00	0.600
Feb-00	1.143
Mar-00	0.916
Apr-00	0.905
May-00	0.996
Jun-00	0.702
Jul-00	1.595
Aug-00	1.627
Sep-00	1.279
Oct-00	1.570

Nov-00	1.638
Dec-00	1.163
Jan-01	1.327
Feb-01	1.283
Mar-01	0.608
Apr-01	0.686
May-01	1.537
Jun-01	0.846
Jul-01	1.492
Aug-01	1.397
Sep-01	1.218
Oct-01	1.372
Nov-01	0.961
Dec-01	1.720
Jan-02	1.700
Feb-02	1.081
Mar-02	1.303
Apr-02	0.890
May-02	2.409
Jun-02	1.880
Jul-02	1.722
Aug-02	1.420
Sep-02	0.702
Oct-02	0.893
Nov-02	2.250
Dec-02	1.858
Jan-03	0.813
Feb-03	0.715
Mar-03	1.463
Apr-03	1.187
May-03	2.245
Jun-03	1.651
Jul-03	0.993
Aug-03	0.604
Sep-03	0.790
Oct-03	1.222
Nov-03	0.499
Dec-03	1.800
Jan-04	2.246
Feb-04	1.479
Mar-04	2.177
Apr-04	1.287
May-04	1.438
Jun-04	1.019
Jul-04	1.611
Aug-04	1.248
Sep-04	1.438
Oct-04	1.548
Nov-04	0.559
Dec-04	0.719
Jan-05	1.203
Feb-05	1.515
Mar-05	1.776
Apr-05	2.645
May-05	1.816
Jun-05	0.735
Jul-05	1.029
Aug-05	0.940
Sep-05	1.523
Oct-05	1.037
Nov-05	1.006
Dec-05	0.644
Jan-06	1.729
Feb-06	1.700
Mar-06	0.806
Apr-06	0.984
May-06	1.118
Jun-06	1.117
Jul-06	1.098
Aug-06	0.945
Sep-06	1.509
Oct-06	1.749
Nov-06	1.189
Dec-06	1.463
Jan-07	1.270
Feb-07	1.119
Mar-07	1.321
Apr-07	0.807
May-07	1.234
Jun-07	1.353
Jul-07	1.380
Aug-07	0.876
Sep-07	1.176
Oct-07	1.201
Nov-07	1.589
Dec-07	2.075
Jan-08	1.818
Feb-08	1.238
Mar-08	1.841
Apr-08	0.862
May-08	1.724
Jun-08	0.953
Jul-08	1.231
Aug-08	1.212
Sep-08	1.447
Oct-08	1.374
Nov-08	1.228
Dec-08	0.899
Jan-09	1.364
Feb-09	0.991
Mar-09	1.133
Apr-09	2.244
May-09	1.081
Jun-09	1.458
Jul-09	0.615
Aug-09	1.129
Sep-09	1.681
Oct-09	0.968
Nov-09	1.781
Dec-09	1.258
Jan-10	1.290
Feb-10	1.301
Mar-10	1.230
Apr-10	0.971
May-10	1.309
Jun-10	1.286
Jul-10	1.664

Aug-10	0.748
Sep-10	0.809
Oct-10	1.372
Nov-10	0.718
Dec-10	0.982
Jan-11	1.596
Feb-11	0.512
Mar-11	1.118
Apr-11	0.941
May-11	1.544
Jun-11	0.679
Jul-11	1.011
Aug-11	1.012
Sep-11	0.907
Oct-11	1.829
Nov-11	1.428
Dec-11	1.388
Jan-12	1.084
Feb-12	1.962
Mar-12	2.276
Apr-12	1.393
May-12	0.508
Jun-12	1.585
Jul-12	1.001
Aug-12	1.424
Sep-12	1.190
Oct-12	1.059
Nov-12	0.754
Dec-12	0.882
Jan-13	1.989
Feb-13	1.634
Mar-13	1.209
Apr-13	0.910
May-13	1.197
Jun-13	1.225
Jul-13	0.887
Aug-13	0.912
Sep-13	1.594
Oct-13	0.820
Nov-13	0.685
Dec-13	1.041
Jan-14	1.177
Feb-14	1.435
Mar-14	1.582
Apr-14	1.319
May-14	1.434
Jun-14	1.109
Jul-14	1.153
Aug-14	1.215
Sep-14	0.649
Oct-14	0.988
Nov-14	1.468
Dec-14	1.386
Jan-15	1.596
Feb-15	0.873
Mar-15	2.524
Apr-15	0.954
May-15	0.751
Jun-15	1.993
Jul-15	1.838
Aug-15	0.843
Sep-15	0.630
Oct-15	1.535
Nov-15	1.866
Dec-15	1.906
Jan-16	1.397
Feb-16	2.060
Mar-16	1.242
Apr-16	0.661
May-16	1.350
Jun-16	1.560
Jul-16	1.009
Aug-16	1.363
Sep-16	0.999
Oct-16	0.680
Nov-16	1.406
Dec-16	0.603
Jan-17	1.208
Feb-17	2.432
Mar-17	0.753
Apr-17	0.784
May-17	1.350
Jun-17	1.011
Jul-17	1.019
Aug-17	0.560
Sep-17	0.586
Oct-17	2.024
Nov-17	0.839
Dec-17	1.455
Jan-18	2.244
Feb-18	2.449
Mar-18	1.136
Apr-18	1.492
May-18	1.774
Jun-18	1.100
Jul-18	1.467
Aug-18	1.160
Sep-18	1.075
Oct-18	1.372
Nov-18	1.371
Dec-18	2.266
Jan-19	1.757
Feb-19	1.749
Mar-19	1.115
Apr-19	1.070
May-19	1.855
Jun-19	1.305
Jul-19	0.874
Aug-19	0.954
Sep-19	1.680
Oct-19	1.532
Nov-19	1.554
Dec-19	0.980
Jan-20	2.001
Feb-20	1.191
Mar-20	1.517
Apr-20	1.637

May-20	1.165
Jun-20	1.355
Jul-20	1.501
Aug-20	1.571
Sep-20	1.108
Oct-20	1.844
Nov-20	1.066
Dec-20	0.846
Jan-21	1.381
Feb-21	1.711
Mar-21	1.149
Apr-21	2.131
May-21	1.619
Jun-21	1.254
Jul-21	1.270
Aug-21	1.333
Sep-21	1.167
Oct-21	1.196
Nov-21	1.064
Dec-21	2.068
Jan-22	1.154
Feb-22	1.294
Mar-22	1.072
Apr-22	0.681
May-22	1.237
Jun-22	1.746
Jul-22	0.991
Aug-22	0.962
Sep-22	0.460
Oct-22	1.504
Nov-22	1.288
Dec-22	1.027

Data Anomali Bulanan

Year	Data Anomali
Jan-82	-0.347
Feb-82	-0.295
Mar-82	-0.145
Apr-82	-0.058
May-82	-0.167
Jun-82	-0.353
Jul-82	-0.426
Aug-82	-0.402
Sep-82	-0.198
Oct-82	-0.112
Nov-82	-0.038
Dec-82	-0.743
Jan-83	-0.334
Feb-83	-0.355
Mar-83	-0.370
Apr-83	-0.278
May-83	-0.333
Jun-83	-0.225
Jul-83	-0.079
Aug-83	0.006
Sep-83	0.031
Oct-83	-0.098
Nov-83	-0.081
Dec-83	-0.178
Jan-84	-0.178
Feb-84	-0.248
Mar-84	-0.372
Apr-84	-0.430
May-84	-0.399
Jun-84	-0.065
Jul-84	-0.023
Aug-84	0.049
Sep-84	0.219
Oct-84	0.226
Nov-84	0.309
Dec-84	0.621
Jan-85	0.742
Feb-85	0.639
Mar-85	-0.039
Apr-85	-0.072
May-85	-0.262
Jun-85	-0.439
Jul-85	-0.709
Aug-85	-0.455
Sep-85	-0.071
Oct-85	-0.001
Nov-85	0.317
Dec-85	0.071
Jan-86	0.570
Feb-86	0.156
Mar-86	0.429
Apr-86	0.206
May-86	0.129
Jun-86	0.072
Jul-86	-0.039
Aug-86	-0.002
Sep-86	0.122
Oct-86	0.019
Nov-86	0.012
Dec-86	-0.140
Jan-87	0.103
Feb-87	0.152
Mar-87	0.135
Apr-87	-0.011
May-87	-0.031
Jun-87	0.145
Jul-87	0.148
Aug-87	0.093
Sep-87	0.048
Oct-87	0.156
Nov-87	0.305
Dec-87	0.371
Jan-88	0.789
Feb-88	0.986
Mar-88	0.725

Apr-88	0.114
May-88	-0.272
Jun-88	-0.308
Jul-88	-0.212
Aug-88	0.042
Sep-88	-0.091
Oct-88	-0.235
Nov-88	-0.145
Dec-88	-0.033
Jan-89	0.083
Feb-89	-0.022
Mar-89	0.053
Apr-89	-0.072
May-89	-0.204
Jun-89	-0.437
Jul-89	-0.339
Aug-89	-0.306
Sep-89	-0.122
Oct-89	-0.051
Nov-89	0.219
Dec-89	0.366
Jan-90	0.698
Feb-90	0.623
Mar-90	0.577
Apr-90	0.040
May-90	-0.309
Jun-90	-0.489
Jul-90	-0.465
Aug-90	-0.247
Sep-90	-0.065
Oct-90	0.120
Nov-90	0.045
Dec-90	-0.020
Jan-91	-0.055
Feb-91	-0.031
Mar-91	-0.006
Apr-91	-0.021
May-91	-0.075
Jun-91	-0.065
Jul-91	-0.002
Aug-91	0.023
Sep-91	-0.114
Oct-91	-0.009
Nov-91	0.170
Dec-91	0.225
Jan-92	0.166
Feb-92	0.031
Mar-92	-0.014
Apr-92	-0.174
May-92	-0.265
Jun-92	-0.320
Jul-92	-0.288
Aug-92	-0.218
Sep-92	-0.098
Oct-92	-0.223
Nov-92	0.213
Dec-92	0.240
Jan-93	0.374
Feb-93	-0.221
Mar-93	-0.311
Apr-93	-0.192
May-93	-0.162
Jun-93	-0.173
Jul-93	-0.522
Aug-93	-0.459
Sep-93	-0.321
Oct-93	-0.090
Nov-93	-0.195
Dec-93	0.069
Jan-94	-0.068
Feb-94	-0.079
Mar-94	-0.230
Apr-94	-0.164
May-94	-0.070
Jun-94	-0.431
Jul-94	-0.200
Aug-94	-0.074
Sep-94	0.173
Oct-94	0.141
Nov-94	0.158
Dec-94	0.061
Jan-95	0.039
Feb-95	0.006
Mar-95	0.174
Apr-95	-0.039
May-95	-0.009
Jun-95	-0.083
Jul-95	-0.024
Aug-95	-0.258
Sep-95	-0.243
Oct-95	-0.128
Nov-95	-0.071
Dec-95	-0.278
Jan-96	-0.118
Feb-96	-0.063
Mar-96	0.221
Apr-96	0.134
May-96	0.320
Jun-96	0.120
Jul-96	-0.052
Aug-96	-0.281
Sep-96	-0.034
Oct-96	0.339
Nov-96	0.448
Dec-96	0.536
Jan-97	0.860
Feb-97	0.956
Mar-97	0.905
Apr-97	0.545
May-97	0.525
Jun-97	0.118
Jul-97	-0.353
Aug-97	-0.560
Sep-97	-0.405
Oct-97	-0.253
Nov-97	-0.157
Dec-97	-0.159

Jan-98	-0.285
Feb-98	-0.335
Mar-98	-0.031
Apr-98	0.028
May-98	-0.044
Jun-98	-0.378
Jul-98	-0.212
Aug-98	-0.063
Sep-98	0.114
Oct-98	-0.116
Nov-98	-0.044
Dec-98	0.000
Jan-99	0.221
Feb-99	0.133
Mar-99	-0.011
Apr-99	-0.029
May-99	-0.117
Jun-99	-0.254
Jul-99	-0.294
Aug-99	-0.213
Sep-99	-0.017
Oct-99	-0.029
Nov-99	-0.206
Dec-99	-0.295
Jan-00	-0.386
Feb-00	-0.284
Mar-00	-0.333
Apr-00	-0.404
May-00	-0.174
Jun-00	0.036
Jul-00	0.228
Aug-00	0.220
Sep-00	0.224
Oct-00	0.185
Nov-00	0.104
Dec-00	-0.014
Jan-01	-0.199
Feb-01	-0.413
Mar-01	-0.328
Apr-01	-0.249
May-01	0.020
Jun-01	-0.027
Jul-01	0.097
Aug-01	0.057
Sep-01	-0.088
Oct-01	0.080
Nov-01	0.189
Dec-01	0.229
Jan-02	0.089
Feb-02	-0.180
Mar-02	0.262
Apr-02	0.455
May-02	0.732
Jun-02	0.402
Jul-02	0.010
Aug-02	-0.267
Sep-02	0.010
Oct-02	0.395
Nov-02	0.369
Dec-02	-0.143
Jan-03	-0.275
Feb-03	-0.150
Mar-03	0.360
Apr-03	0.423
May-03	0.358
Jun-03	-0.189
Jul-03	-0.476
Aug-03	-0.400
Sep-03	-0.435
Oct-03	-0.098
Nov-03	0.243
Dec-03	0.570
Jan-04	0.695
Feb-04	0.376
Mar-04	0.362
Apr-04	-0.024
May-04	0.084
Jun-04	0.021
Jul-04	0.161
Aug-04	0.140
Sep-04	-0.090
Oct-04	-0.330
Nov-04	-0.445
Dec-04	-0.126
Jan-05	0.226
Feb-05	0.706
Mar-05	0.807
Apr-05	0.460
May-05	-0.079
Jun-05	-0.371
Jul-05	-0.108
Aug-05	-0.105
Sep-05	-0.083
Oct-05	-0.376
Nov-05	-0.145
Dec-05	0.086
Jan-06	0.140
Feb-06	-0.109
Mar-06	-0.302
Apr-06	-0.199
May-06	-0.161
Jun-06	-0.218
Jul-06	-0.088
Aug-06	0.129
Sep-06	0.210
Oct-06	0.195
Nov-06	0.036
Dec-06	0.012
Jan-07	-0.035
Feb-07	-0.190
Mar-07	-0.151
Apr-07	-0.141
May-07	0.050
Jun-07	-0.069
Jul-07	-0.128
Aug-07	-0.187
Sep-07	0.050

Oct-07	0.350
Nov-07	0.556
Dec-07	0.439
Jan-08	0.361
Feb-08	0.042
Mar-08	0.204
Apr-08	-0.092
May-08	0.031
Jun-08	-0.140
Jul-08	0.025
Aug-08	0.072
Sep-08	0.077
Oct-08	-0.105
Nov-08	-0.108
Dec-08	-0.187
Jan-09	-0.109
Feb-09	0.184
Mar-09	0.214
Apr-09	0.323
May-09	-0.220
Jun-09	-0.204
Jul-09	-0.130
Aug-09	-0.013
Sep-09	0.205
Oct-09	0.064
Nov-09	0.171
Dec-09	0.011
Jan-10	0.002
Feb-10	-0.105
Mar-10	-0.102
Apr-10	-0.083
May-10	0.148
Jun-10	-0.040
Jul-10	-0.198
Aug-10	-0.295
Sep-10	-0.305
Oct-10	-0.248
Nov-10	-0.173
Dec-10	-0.242
Jan-11	-0.197
Feb-11	-0.415
Mar-11	-0.071
Apr-11	-0.217
May-11	-0.194
Jun-11	-0.371
Jul-11	-0.295
Aug-11	-0.023
Sep-11	0.116
Oct-11	0.277
Nov-11	0.028
Dec-11	0.206
Jan-12	0.502
Feb-12	0.605
Mar-12	0.120
Apr-12	-0.110
May-12	-0.240
Jun-12	0.065
Jul-12	-0.067
Aug-12	-0.048
Sep-12	-0.271
Oct-12	-0.373
Nov-12	-0.063
Dec-12	0.230
Jan-13	0.339
Feb-13	-0.021
Mar-13	-0.167
Apr-13	-0.161
May-13	-0.169
Jun-13	-0.264
Jul-13	-0.141
Aug-13	-0.163
Sep-13	-0.239
Oct-13	-0.423
Nov-13	-0.304
Dec-13	-0.054
Jan-14	0.126
Feb-14	0.173
Mar-14	0.173
Apr-14	0.015
May-14	-0.040
Jun-14	-0.113
Jul-14	-0.266
Aug-14	-0.321
Sep-14	-0.237
Oct-14	0.009
Nov-14	0.211
Dec-14	0.013
Jan-15	0.392
Feb-15	0.178
Mar-15	0.138
Apr-15	-0.039
May-15	0.255
Jun-15	0.286
Jul-15	-0.168
Aug-15	-0.269
Sep-15	0.072
Oct-15	0.497
Nov-15	0.451
Dec-15	0.516
Jan-16	0.295
Feb-16	0.049
Mar-16	-0.187
Apr-16	-0.082
May-16	0.034
Jun-16	0.039
Jul-16	-0.148
Aug-16	-0.258
Sep-16	-0.244
Oct-16	-0.376
Nov-16	-0.200
Dec-16	0.142
Jan-17	0.192
Feb-17	0.051
Mar-17	-0.309
Apr-17	-0.223
May-17	-0.145
Jun-17	-0.408

Jul-17	-0.550
Aug-17	-0.215
Sep-17	-0.122
Oct-17	0.167
Nov-17	0.241
Dec-17	0.778
Jan-18	0.671
Feb-18	0.421
Mar-18	0.195
Apr-18	0.183
May-18	0.175
Jun-18	-0.029
Jul-18	-0.038
Aug-18	-0.069
Sep-18	0.001
Oct-18	0.398
Nov-18	0.526
Dec-18	0.652
Jan-19	0.268
Feb-19	0.039
Mar-19	0.074
Apr-19	0.138
May-19	0.072
Jun-19	-0.228
Jul-19	-0.103
Aug-19	0.117
Sep-19	0.317
Oct-19	0.083
Nov-19	0.240
Dec-19	0.119
Jan-20	0.298
Feb-20	0.177
Mar-20	0.168
Apr-20	0.114
May-20	0.068
Jun-20	0.204
Jul-20	0.121
Aug-20	0.236
Sep-20	0.068
Oct-20	-0.020
Nov-20	-0.174
Dec-20	0.041
Jan-21	0.142
Feb-21	0.392
Mar-21	0.361
Apr-21	0.396
May-21	0.109
Jun-21	0.014
Jul-21	-0.015
Aug-21	-0.040
Sep-21	-0.129
Oct-21	0.171
Nov-21	0.157
Dec-21	0.234
Jan-22	-0.099
Feb-22	-0.256
Mar-22	-0.275
Apr-22	-0.051
May-22	0.053
Jun-22	-0.039
Jul-22	-0.468
Aug-22	-0.297
Sep-22	-0.188
Oct-22	0.001
Nov-22	-0.114
Dec-22	-0.245

Data Seasonal 3 Bulanan

YEAR	SEASON (3 BULAN)											
	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ	DJF
1982	-0.347	-0.295	-0.145	-0.058	-0.167	-0.353	-0.426	-0.402	-0.198	-0.112	-0.038	-0.743
1983	-0.334	-0.355	-0.370	-0.278	-0.333	-0.225	-0.079	0.006	0.031	-0.098	-0.081	-0.178
1984	-0.178	-0.248	-0.372	-0.430	-0.399	-0.065	-0.023	0.049	0.219	0.226	0.309	0.621
1985	0.742	0.639	-0.039	-0.072	-0.262	-0.439	-0.709	-0.455	-0.071	-0.001	0.317	0.071
1986	0.570	0.156	0.429	0.206	0.129	0.072	-0.039	-0.002	0.122	0.019	0.012	-0.140
1987	0.103	0.152	0.135	-0.011	-0.031	0.145	0.148	0.093	0.048	0.156	0.305	0.371
1988	0.789	0.986	0.725	0.114	-0.272	-0.308	-0.212	0.042	-0.091	-0.235	-0.145	-0.033
1989	0.083	-0.022	0.053	-0.072	-0.204	-0.437	-0.339	-0.306	-0.122	-0.051	0.219	0.366
1990	0.698	0.623	0.577	0.040	-0.309	-0.489	-0.465	-0.247	-0.065	0.120	0.045	-0.020
1991	-0.055	-0.031	-0.006	-0.021	-0.075	-0.065	-0.002	0.023	-0.114	-0.009	0.170	0.225
1992	0.166	0.031	-0.014	-0.174	-0.265	-0.320	-0.288	-0.218	-0.098	-0.223	0.213	0.240
1993	0.374	-0.221	-0.311	-0.192	-0.162	-0.173	-0.522	-0.459	-0.321	-0.090	-0.195	0.069
1994	-0.068	-0.079	-0.230	-0.164	-0.070	-0.431	-0.200	-0.074	0.173	0.141	0.158	0.061
1995	0.039	0.006	0.174	-0.039	-0.009	-0.083	-0.024	-0.258	-0.243	-0.128	-0.071	-0.278
1996	-0.118	-0.063	0.221	0.134	0.320	0.120	-0.052	-0.281	-0.034	0.339	0.448	0.536
1997	0.860	0.956	0.905	0.545	0.525	0.118	-0.353	-0.560	-0.405	-0.253	-0.157	-0.159
1998	-0.285	-0.335	-0.031	0.028	-0.044	-0.378	-0.212	-0.063	0.114	-0.116	-0.044	0.000
1999	0.221	0.133	-0.011	-0.029	-0.117	-0.254	-0.294	-0.213	-0.017	-0.029	-0.206	-0.295
2000	-0.386	-0.284	-0.333	-0.404	-0.174	0.036	0.228	0.220	0.224	0.185	0.104	-0.014
2001	-0.199	-0.413	-0.328	-0.249	0.020	-0.027	0.097	0.057	-0.088	0.080	0.189	0.229
2002	0.089	-0.180	0.262	0.455	0.732	0.402	0.010	-0.267	0.010	0.395	0.369	-0.143
2003	-0.275	-0.150	0.360	0.423	0.358	-0.189	-0.476	-0.400	-0.435	-0.098	0.243	0.570
2004	0.695	0.376	0.362	-0.024	0.084	0.021	0.161	0.140	-0.090	-0.330	-0.445	-0.126
2005	0.226	0.706	0.807	0.460	-0.079	-0.371	-0.108	-0.105	-0.083	-0.376	-0.145	0.086
2006	0.140	-0.109	-0.302	-0.199	-0.161	-0.218	-0.088	0.129	0.210	0.195	0.036	0.012
2007	-0.035	-0.190	-0.151	-0.141	0.050	-0.069	-0.128	-0.187	0.050	0.350	0.556	0.439
2008	0.361	0.042	0.204	-0.092	0.031	-0.140	0.025	0.072	0.077	-0.105	-0.108	-0.187
2009	-0.109	0.184	0.214	0.323	-0.220	-0.204	-0.130	-0.013	0.205	0.064	0.171	0.011
2010	0.002	-0.105	-0.102	-0.083	0.148	-0.040	-0.198	-0.295	-0.305	-0.248	-0.173	-0.242
2011	-0.197	-0.415	-0.071	-0.217	-0.194	-0.371	-0.295	-0.023	0.116	0.277	0.028	0.206
2012	0.502	0.605	0.120	-0.110	-0.240	0.065	-0.067	-0.048	-0.271	-0.373	-0.063	0.230
2013	0.339	-0.021	-0.167	-0.161	-0.169	-0.264	-0.141	-0.163	-0.239	-0.423	-0.304	-0.054
2014	0.126	0.173	0.173	0.015	-0.040	-0.113	-0.266	-0.321	-0.237	0.009	0.211	0.013
2015	0.392	0.178	0.138	-0.039	0.255	0.286	-0.168	-0.269	0.072	0.497	0.451	0.516
2016	0.295	0.049	-0.187	-0.082	0.034	0.039	-0.148	-0.258	-0.244	-0.376	-0.200	0.142
2017	0.192	0.051	-0.309	-0.223	-0.145	-0.408	-0.550	-0.215	-0.122	0.167	0.241	0.778
2018	0.671	0.421	0.195	0.183	0.175	-0.029	-0.038	-0.069	0.001	0.398	0.526	0.652
2019	0.268	0.039	0.074	0.138	0.072	-0.228	-0.103	0.117	0.317	0.083	0.240	0.119
2020	0.298	0.177	0.168	0.114	0.068	0.204	0.121	0.236	0.068	-0.020	-0.174	0.041
2021	0.142	0.392	0.361	0.396	0.109	0.014	-0.015	-0.040	-0.129	0.171	0.157	0.234
2022	-0.099	-0.256	-0.275	-0.051	0.053	-0.039	-0.468	-0.297	-0.188	0.001	-0.114	-0.245

Lampiran 3. Data *East Asian Summer Monsoon Index* (EASMI)
Data Raw dan Seasonal JJA

YEAR	RAW	RAW	RAW	RAW	NORM	NORM	NORM	NORM
	Jun	Jul	Aug	JJA	Jun	Jul	Aug	JJA
1982	0.853	1.430	1.217	1.167	0.064	0.863	-0.127	0.383
1983	0.617	0.461	0.976	0.684	-0.696	-1.425	-0.601	-1.364
1984	1.024	0.587	2.253	1.288	0.614	-1.127	1.906	0.824
1985	1.795	0.534	2.045	1.458	3.094	-1.253	1.497	1.438
1986	0.733	0.961	1.725	1.139	-0.323	-0.245	0.868	0.285
1987	0.901	1.130	0.551	0.861	0.219	0.156	-1.434	-0.724
1988	0.635	0.573	0.546	0.585	-0.636	-1.160	-1.444	-1.724
1989	0.395	0.910	1.195	0.833	-1.409	-0.365	-0.170	-0.823
1990	1.024	0.913	1.799	1.245	0.612	-0.358	1.015	0.668
1991	0.612	1.115	1.388	1.038	-0.712	0.119	0.207	-0.082
1992	0.691	0.444	1.661	0.932	-0.457	-1.465	0.744	-0.466
1993	0.576	0.890	1.039	0.835	-0.826	-0.411	-0.477	-0.817
1994	0.669	1.726	1.419	1.271	-0.528	1.562	0.269	0.763
1995	0.782	0.772	0.707	0.753	-0.166	-0.692	-1.128	-1.114
1996	0.030	1.139	0.758	0.642	-2.585	0.176	-1.028	-1.517
1997	1.028	0.976	2.006	1.337	0.626	-0.208	1.421	1.000
1998	0.760	0.566	0.179	0.501	-0.237	-1.178	-2.164	-2.026
1999	0.931	1.712	1.077	1.240	0.316	1.530	-0.402	0.650
2000	0.502	1.380	1.313	1.065	-1.065	0.745	0.061	0.016
2001	0.773	1.294	1.461	1.176	-0.193	0.542	0.350	0.417
2002	0.744	2.035	1.129	1.303	-0.287	2.294	-0.300	0.877
2003	0.767	0.387	1.149	0.768	-0.214	-1.600	-0.260	-1.062
2004	1.073	0.552	2.004	1.210	0.773	-1.210	1.417	0.540
2005	1.109	0.833	1.386	1.109	0.886	-0.546	0.204	0.175
2006	0.474	1.766	1.471	1.237	-1.154	1.657	0.370	0.638
2007	0.327	0.591	1.597	0.838	-1.628	-1.119	0.618	-0.806
2008	0.605	0.959	0.684	0.749	-0.735	-0.248	-1.173	-1.128
2009	1.051	1.187	1.167	1.135	0.701	0.289	-0.226	0.269
2010	0.489	0.499	0.823	0.603	-1.108	-1.335	-0.901	-1.657
2011	0.737	0.982	0.916	0.878	-0.311	-0.194	-0.717	-0.661
2012	1.501	1.027	1.918	1.482	2.150	-0.088	1.249	1.527
2013	0.590	0.663	1.044	0.765	-0.784	-0.948	-0.468	-1.070
2014	0.906	1.196	0.655	0.919	0.234	0.311	-1.231	-0.514
2015	0.394	1.462	0.832	0.896	-1.412	0.939	-0.882	-0.596
2016	0.490	0.553	1.727	0.923	-1.103	-1.208	0.873	-0.498

2017	0.659	0.859	0.483	0.667	-0.561	-0.485	-1.568	-1.427
2018	1.233	1.845	2.225	1.768	1.287	1.843	1.850	2.560
2019	0.763	1.169	1.898	1.277	-0.227	0.246	1.209	0.782
2020	0.522	0.446	0.943	0.637	-1.001	-1.460	-0.665	-1.535
2021	0.998	1.435	0.746	1.060	0.530	0.875	-1.051	-0.004
2022	0.560	0.543	0.520	0.541	-0.880	-1.230	-1.495	-1.882

Lampiran 4. Data Indeks *El-Niño Southern Oscillation* (ENSO)

Data Raw Bulanan

YEAR	MON	ANOM
1982	1	0.13
1982	2	-0.17
1982	3	0.13
1982	4	0.21
1982	5	0.45
1982	6	0.53
1982	7	0.37
1982	8	0.73
1982	9	1.49
1982	10	1.99
1982	11	1.92
1982	12	2.20
1983	1	2.35
1983	2	1.94
1983	3	1.38
1983	4	0.95
1983	5	0.90
1983	6	0.54
1983	7	-0.11
1983	8	-0.27
1983	9	-0.52
1983	10	-1.16
1983	11	-1.29
1983	12	-1.03
1984	1	-0.67
1984	2	-0.19
1984	3	-0.52
1984	4	-0.68
1984	5	-0.73
1984	6	-0.90
1984	7	-0.50
1984	8	-0.24
1984	9	-0.34
1984	10	-0.67
1984	11	-1.19
1984	12	-1.34
1985	1	-1.16
1985	2	-0.72
1985	3	-0.79
1985	4	-1.18
1985	5	-1.03
1985	6	-0.91
1985	7	-0.74
1985	8	-0.56
1985	9	-0.70
1985	10	-0.49
1985	11	-0.37
1985	12	-0.41
1986	1	-0.66
1986	2	-0.71
1986	3	-0.42
1986	4	-0.33
1986	5	-0.53
1986	6	-0.31
1986	7	-0.11
1986	8	0.32
1986	9	0.53
1986	10	0.81
1986	11	1.01
1986	12	1.12
1987	1	1.14
1987	2	1.13
1987	3	0.98
1987	4	0.58
1987	5	0.62
1987	6	0.92
1987	7	1.29
1987	8	1.57
1987	9	1.65
1987	10	1.24
1987	11	1.07
1987	12	0.94
1988	1	0.90
1988	2	0.28
1988	3	0.10
1988	4	-0.44
1988	5	-1.25
1988	6	-1.74
1988	7	-1.74
1988	8	-1.19
1988	9	-1.00
1988	10	-1.90
1988	11	-2.05
1988	12	-1.96
1989	1	-1.97
1989	2	-1.47
1989	3	-1.21
1989	4	-1.08
1989	5	-0.88
1989	6	-0.59
1989	7	-0.57
1989	8	-0.53
1989	9	-0.30
1989	10	-0.40
1989	11	-0.45
1989	12	-0.13
1990	1	0.01
1990	2	0.21
1990	3	0.04
1990	4	0.08
1990	5	0.08
1990	6	-0.08
1990	7	0.09
1990	8	0.22
1990	9	0.22
1990	10	0.21
1990	11	0.10
1990	12	0.35
1991	1	0.49
1991	2	0.32

1991	3	0.03
1991	4	0.19
1991	5	0.26
1991	6	0.52
1991	7	0.76
1991	8	0.68
1991	9	0.42
1991	10	0.86
1991	11	1.20
1991	12	1.69
1992	1	1.84
1992	2	1.78
1992	3	1.38
1992	4	1.20
1992	5	1.04
1992	6	0.58
1992	7	0.22
1992	8	0.05
1992	9	-0.06
1992	10	-0.30
1992	11	-0.28
1992	12	-0.15
1993	1	0.14
1993	2	0.41
1993	3	0.39
1993	4	0.59
1993	5	0.78
1993	6	0.35
1993	7	0.23
1993	8	0.13
1993	9	0.35
1993	10	0.06
1993	11	0.00
1993	12	0.16
1994	1	0.10
1994	2	0.06
1994	3	0.11
1994	4	0.26
1994	5	0.31
1994	6	0.32
1994	7	0.24
1994	8	0.53
1994	9	0.48
1994	10	0.75
1994	11	1.11
1994	12	1.25
1995	1	1.02
1995	2	0.73
1995	3	0.46
1995	4	0.28
1995	5	-0.11
1995	6	-0.14
1995	7	-0.21
1995	8	-0.63
1995	9	-0.84
1995	10	-0.88
1995	11	-1.10
1995	12	-0.95
1996	1	-0.86
1996	2	-0.86
1996	3	-0.61
1996	4	-0.47
1996	5	-0.38
1996	6	-0.44
1996	7	-0.44
1996	8	-0.22
1996	9	-0.45
1996	10	-0.44
1996	11	-0.41
1996	12	-0.64
1997	1	-0.53
1997	2	-0.37
1997	3	-0.25
1997	4	0.16
1997	5	0.64
1997	6	1.09
1997	7	1.56
1997	8	1.89
1997	9	2.13
1997	10	2.36
1997	11	2.41
1997	12	2.29
1998	1	2.38
1998	2	2.03
1998	3	1.34
1998	4	0.78
1998	5	0.57
1998	6	-0.39
1998	7	-0.99
1998	8	-1.28
1998	9	-1.26
1998	10	-1.46
1998	11	-1.46
1998	12	-1.69
1999	1	-1.69
1999	2	-1.32
1999	3	-0.95
1999	4	-1.11
1999	5	-1.15
1999	6	-1.19
1999	7	-1.17
1999	8	-1.22
1999	9	-1.09
1999	10	-1.23
1999	11	-1.58
1999	12	-1.74
2000	1	-1.77
2000	2	-1.55
2000	3	-0.98
2000	4	-0.87
2000	5	-0.86
2000	6	-0.79
2000	7	-0.67
2000	8	-0.49
2000	9	-0.52
2000	10	-0.70
2000	11	-0.79

2000	12	-0.92
2001	1	-0.73
2001	2	-0.63
2001	3	-0.48
2001	4	-0.49
2001	5	-0.34
2001	6	-0.19
2001	7	-0.04
2001	8	-0.05
2001	9	-0.20
2001	10	-0.14
2001	11	-0.37
2001	12	-0.41
2002	1	-0.15
2002	2	-0.04
2002	3	0.01
2002	4	0.02
2002	5	0.31
2002	6	0.72
2002	7	0.74
2002	8	0.87
2002	9	1.09
2002	10	1.25
2002	11	1.47
2002	12	1.37
2003	1	0.60
2003	2	0.64
2003	3	0.36
2003	4	-0.14
2003	5	-0.61
2003	6	-0.29
2003	7	0.21
2003	8	0.26
2003	9	0.27
2003	10	0.42
2003	11	0.33
2003	12	0.43
2004	1	0.27
2004	2	0.23

2004	3	0.12
2004	4	0.07
2004	5	0.06
2004	6	0.13
2004	7	0.49
2004	8	0.76
2004	9	0.81
2004	10	0.73
2004	11	0.66
2004	12	0.74
2005	1	0.66
2005	2	0.36
2005	3	0.45
2005	4	0.26
2005	5	0.30
2005	6	0.04
2005	7	-0.23
2005	8	-0.05
2005	9	-0.04
2005	10	-0.06
2005	11	-0.59
2005	12	-0.92
2006	1	-0.91
2006	2	-0.67
2006	3	-0.71
2006	4	-0.32
2006	5	-0.09
2006	6	0.00
2006	7	0.01
2006	8	0.31
2006	9	0.60
2006	10	0.70
2006	11	0.99
2006	12	1.14
2007	1	0.70
2007	2	0.13
2007	3	-0.18
2007	4	-0.32
2007	5	-0.47

2007	6	-0.35
2007	7	-0.59
2007	8	-0.72
2007	9	-1.11
2007	10	-1.39
2007	11	-1.54
2007	12	-1.58
2008	1	-1.68
2008	2	-1.67
2008	3	-1.21
2008	4	-0.99
2008	5	-0.84
2008	6	-0.68
2008	7	-0.30
2008	8	-0.13
2008	9	-0.25
2008	10	-0.35
2008	11	-0.46
2008	12	-0.86
2009	1	-0.89
2009	2	-0.79
2009	3	-0.69
2009	4	-0.35
2009	5	0.06
2009	6	0.31
2009	7	0.48
2009	8	0.56
2009	9	0.68
2009	10	0.89
2009	11	1.46
2009	12	1.74
2010	1	1.52
2010	2	1.25
2010	3	0.90
2010	4	0.38
2010	5	-0.22
2010	6	-0.69
2010	7	-1.07
2010	8	-1.39

2010	9	-1.60
2010	10	-1.69
2010	11	-1.64
2010	12	-1.60
2011	1	-1.54
2011	2	-1.11
2011	3	-0.93
2011	4	-0.77
2011	5	-0.52
2011	6	-0.38
2011	7	-0.43
2011	8	-0.65
2011	9	-0.80
2011	10	-1.05
2011	11	-1.19
2011	12	-1.06
2012	1	-0.87
2012	2	-0.67
2012	3	-0.61
2012	4	-0.50
2012	5	-0.32
2012	6	0.02
2012	7	0.25
2012	8	0.47
2012	9	0.38
2012	10	0.26
2012	11	0.16
2012	12	-0.25
2013	1	-0.53
2013	2	-0.52
2013	3	-0.25
2013	4	-0.25
2013	5	-0.40
2013	6	-0.42
2013	7	-0.39
2013	8	-0.38
2013	9	-0.18
2013	10	-0.20
2013	11	-0.14
2013	12	-0.17
2014	1	-0.49
2014	2	-0.62
2014	3	-0.28
2014	4	0.08
2014	5	0.32
2014	6	0.23
2014	7	-0.06
2014	8	-0.03
2014	9	0.29
2014	10	0.44
2014	11	0.75
2014	12	0.71
2015	1	0.51
2015	2	0.42
2015	3	0.47
2015	4	0.70
2015	5	0.92
2015	6	1.18
2015	7	1.46
2015	8	1.93
2015	9	2.21
2015	10	2.36
2015	11	2.72
2015	12	2.66
2016	1	2.57
2016	2	2.26
2016	3	1.62
2016	4	0.91
2016	5	0.30
2016	6	-0.03
2016	7	-0.48
2016	8	-0.58
2016	9	-0.58
2016	10	-0.74
2016	11	-0.76
2016	12	-0.50
2017	1	-0.43
2017	2	-0.08
2017	3	0.03
2017	4	0.22
2017	5	0.37
2017	6	0.34
2017	7	0.25
2017	8	-0.16
2017	9	-0.43
2017	10	-0.56
2017	11	-0.97
2017	12	-0.98
2018	1	-0.98
2018	2	-0.78
2018	3	-0.80
2018	4	-0.51
2018	5	-0.20
2018	6	0.04
2018	7	0.12
2018	8	0.09
2018	9	0.47
2018	10	0.90
2018	11	0.90
2018	12	0.89
2019	1	0.65
2019	2	0.71
2019	3	0.81
2019	4	0.62
2019	5	0.55
2019	6	0.45
2019	7	0.35
2019	8	0.04
2019	9	0.03
2019	10	0.48
2019	11	0.52
2019	12	0.52
2020	1	0.60
2020	2	0.37
2020	3	0.48
2020	4	0.36
2020	5	-0.27

2020	6	-0.34
2020	7	-0.30
2020	8	-0.59
2020	9	-0.83
2020	10	-1.26
2020	11	-1.42
2020	12	-1.15
2021	1	-1.00
2021	2	-1.00
2021	3	-0.80
2021	4	-0.72

2021	5	-0.46
2021	6	-0.28
2021	7	-0.39
2021	8	-0.53
2021	9	-0.55
2021	10	-0.94
2021	11	-0.94
2021	12	-1.06
2022	1	-0.94
2022	2	-0.89
2022	3	-0.97

2022	4	-1.11
2022	5	-1.11
2022	6	-0.75
2022	7	-0.69
2022	8	-0.97
2022	9	-1.07
2022	10	-0.99
2022	11	-0.90
2022	12	-0.85

Data Seasonal 3 Bulanan

YEAR	SEASON (3 BULAN)											
	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ	DJF
1982	0.030	0.057	0.263	0.397	0.450	0.543	0.863	1.403	1.800	2.037	2.157	2.163
1983	1.890	1.423	1.077	0.797	0.443	0.053	-0.300	-0.650	-0.990	-1.160	-0.997	-0.630
1984	-0.460	-0.463	-0.643	-0.770	-0.710	-0.547	-0.360	-0.417	-0.733	-1.067	-1.230	-1.073
1985	-0.890	-0.897	-1.000	-1.040	-0.893	-0.737	-0.667	-0.583	-0.520	-0.423	-0.480	-0.593
1986	-0.597	-0.487	-0.427	-0.390	-0.317	-0.033	0.247	0.553	0.783	0.980	1.090	1.130
1987	1.083	0.897	0.727	0.707	0.943	1.260	1.503	1.487	1.320	1.083	0.970	0.707
1988	0.427	-0.020	-0.530	-1.143	-1.577	-1.557	-1.310	-1.363	-1.650	-1.970	-1.993	-1.800
1989	-1.550	-1.253	-1.057	-0.850	-0.680	-0.563	-0.467	-0.410	-0.383	-0.327	-0.190	0.030
1990	0.087	0.110	0.067	0.027	0.030	0.077	0.177	0.217	0.177	0.220	0.313	0.387
1991	0.280	0.180	0.160	0.323	0.513	0.653	0.620	0.653	0.827	1.250	1.577	1.770
1992	1.667	1.453	1.207	0.940	0.613	0.283	0.070	-0.103	-0.213	-0.243	-0.097	0.133
1993	0.313	0.463	0.587	0.573	0.453	0.237	0.237	0.180	0.137	0.073	0.087	0.107
1994	0.090	0.143	0.227	0.297	0.290	0.363	0.417	0.587	0.780	1.037	1.127	1.000
1995	0.737	0.490	0.210	0.010	-0.153	-0.327	-0.560	-0.783	-0.940	-0.977	-0.970	-0.890
1996	-0.777	-0.647	-0.487	-0.430	-0.420	-0.367	-0.370	-0.370	-0.433	-0.497	-0.527	-0.513
1997	-0.383	-0.153	0.183	0.630	1.097	1.513	1.860	2.127	2.300	2.353	2.360	2.233
1998	1.917	1.383	0.897	0.320	-0.270	-0.887	-1.177	-1.333	-1.393	-1.537	-1.613	-1.567
1999	-1.320	-1.127	-1.070	-1.150	-1.170	-1.193	-1.160	-1.180	-1.300	-1.517	-1.697	-1.687
2000	-1.433	-1.133	-0.903	-0.840	-0.773	-0.650	-0.560	-0.570	-0.670	-0.803	-0.813	-0.760
2001	-0.613	-0.533	-0.437	-0.340	-0.190	-0.093	-0.097	-0.130	-0.237	-0.307	-0.310	-0.200
2002	-0.060	-0.003	0.113	0.350	0.590	0.777	0.900	1.070	1.270	1.363	1.147	0.870
2003	0.533	0.287	-0.130	-0.347	-0.230	0.060	0.247	0.317	0.340	0.393	0.343	0.310
2004	0.207	0.140	0.083	0.087	0.227	0.460	0.687	0.767	0.733	0.710	0.687	0.587
2005	0.490	0.357	0.337	0.200	0.037	-0.080	-0.107	-0.050	-0.230	-0.523	-0.807	-0.833
2006	-0.763	-0.567	-0.373	-0.137	-0.027	0.107	0.307	0.537	0.763	0.943	0.943	0.657
2007	0.217	-0.123	-0.323	-0.380	-0.470	-0.553	-0.807	-1.073	-1.347	-1.503	-1.600	-1.643
2008	-1.520	-1.290	-1.013	-0.837	-0.607	-0.370	-0.227	-0.243	-0.353	-0.557	-0.737	-0.847
2009	-0.790	-0.610	-0.327	0.007	0.283	0.450	0.573	0.710	1.010	1.363	1.573	1.503
2010	1.223	0.843	0.353	-0.177	-0.660	-1.050	-1.353	-1.560	-1.643	-1.643	-1.593	-1.417
2011	-1.193	-0.937	-0.740	-0.557	-0.443	-0.487	-0.627	-0.833	-1.013	-1.100	-1.040	-0.867
2012	-0.717	-0.593	-0.477	-0.267	-0.017	0.247	0.367	0.370	0.267	0.057	-0.207	-0.433
2013	-0.433	-0.340	-0.300	-0.357	-0.403	-0.397	-0.317	-0.253	-0.173	-0.170	-0.267	-0.427
2014	-0.463	-0.273	0.040	0.210	0.163	0.047	0.067	0.233	0.493	0.633	0.657	0.547
2015	0.467	0.530	0.697	0.933	1.187	1.523	1.867	2.167	2.430	2.580	2.650	2.497
2016	2.150	1.597	0.943	0.393	-0.070	-0.363	-0.547	-0.633	-0.693	-0.667	-0.563	-0.337
2017	-0.160	0.057	0.207	0.310	0.320	0.143	-0.113	-0.383	-0.653	-0.837	-0.977	-0.913
2018	-0.853	-0.697	-0.503	-0.223	-0.013	0.083	0.227	0.487	0.757	0.897	0.813	0.750
2019	0.723	0.713	0.660	0.540	0.450	0.280	0.140	0.183	0.343	0.507	0.547	0.497
2020	0.483	0.403	0.190	-0.083	-0.303	-0.410	-0.573	-0.893	-1.170	-1.277	-1.190	-1.050
2021	-0.933	-0.840	-0.660	-0.487	-0.377	-0.400	-0.490	-0.673	-0.810	-0.980	-0.980	-0.963
2022	-0.933	-0.990	-1.063	-0.990	-0.850	-0.803	-0.910	-1.010	-0.987	-0.913	-0.875	-0.850

Lampiran 5. Nilai *Percent Correct* (PC) Setiap *Season*
Australia

AUSTRALIA				
Bulan	**Polinomial Orde N**	**Percent Correct (%)**		
		MJO	***Monsoon***	**ENSO**
JFM	1	31.7073		43.9024
	2	31.7073		41.4634
	3	29.2683		43.9024
FMA	1	36.5854		39.0244
	2	41.4634		36.5854
	3	31.7073		39.0244
MAM	1	46.3415		31.7073
	2	46.3415		29.2683
	3	46.3415		34.1463
AMJ	1	46.3415		31.7073
	2	43.9024		29.2683
	3	43.9024		36.5854
MJJ	1	36.5854		29.2683
	2	36.5854		26.8293
	3	41.4634		36.5854
JJA	1	34.1463	29.2683	31.7073
	2	34.1463	34.1463	34.1463
	3	21.9512	24.3902	34.1463
JAS	1	31.7073		34.1463
	2	31.7073		36.5854
	3	26.8293		34.1463
ASO	1	36.5854		36.5854
	2	36.5854		39.0244
	3	31.7073		36.5854
SON	1	36.5854		39.0244
	2	36.5854		41.4634
	3	36.5854		43.9024
OND	1	31.7073		41.4634
	2	29.2683		41.4634
	3	31.7073		46.3415
NDJ	1	34.1463		39.0244
	2	34.1463		39.0244
	3	34.1463		43.9024
DJF	1	36.5854		36.5854
	2	39.0244		39.0244
	3	41.4634		41.4634

Argentina

ARGENTINA				
Bulan	**Polinomial Orde N**	**Percent Correct (%)**		
		MJO	***Monsoon***	**ENSO**
JFM	1	41.4634		26.8293
	2	43.9024		29.2683
	3	48.7805		36.5854
FMA	1	48.7805		24.3902
	2	53.6585		26.8293
	3	51.2195		39.0244
MAM	1	43.9024		24.3902
	2	48.7805		29.2683
	3	46.3415		41.4634
AMJ	1	53.6585		29.2683
	2	53.6585		26.8293
	3	53.6585		34.1463
MJJ	1	48.7805		31.7073
	2	43.9024		29.2683
	3	51.2195		36.5854
JJA	1	43.9024	31.7073	29.2683
	2	39.0244	34.1463	29.2683
	3	39.0244	24.3902	34.1463
JAS	1	29.2683		26.8293
	2	26.8293		26.8293
	3	31.7073		34.1463
ASO	1	17.0732		26.8293
	2	14.6341		26.8293
	3	21.9512		29.2683
SON	1	36.5854		31.7073
	2	36.5854		31.7073
	3	39.0244		34.1463
OND	1	31.7073		39.0244
	2	29.2683		39.0244
	3	26.8293		36.5854
NDJ	1	34.1463		39.0244
	2	34.1463		39.0244
	3	34.1463		36.5854
DJF	1	26.8293		41.4634
	2	26.8293		41.4634
	3	31.7073		36.5854

Kanada

KANADA				
Bulan	**Polinomial Orde N**	**Percent Correct (%)**		
		MJO	***Monsoon***	**ENSO**
JFM	1	34.1463		21.9512
	2	34.1463		21.9512
	3	31.7073		21.9512
FMA	1	26.8293		21.9512
	2	34.1463		21.9512
	3	24.3902		19.5122
MAM	1	41.4634		21.9512
	2	39.0244		24.3902
	3	36.5854		17.0732
AMJ	1	39.0244		19.5122
	2	29.2683		26.8293
	3	36.5854		24.3902
MJJ	1	34.1463		24.3902
	2	36.5854		34.1463
	3	43.9024		31.7073
JJA	1	46.3415	46.3415	29.2683
	2	39.0244	46.3415	34.1463
	3	43.9024	43.9024	31.7073
JAS	1	24.3902		24.3902
	2	29.2683		31.7073
	3	34.1463		31.7073
ASO	1	26.8293		31.7073
	2	29.2683		29.2683
	3	46.3415		29.2683
SON	1	29.2683		34.1463
	2	21.9512		29.2683
	3	31.7073		29.2683
OND	1	41.4634		34.1463
	2	31.7073		29.2683
	3	36.5854		21.9512
NDJ	1	43.9024		36.5854
	2	43.9024		31.7073
	3	46.3415		24.3902
DJF	1	39.0244		31.7073
	2	41.4634		31.7073
	3	41.4634		21.9512

Lampiran 6. *Script* Pengolahan Data Pada *Software MATLAB R2017a*
***Madden Julian Oscillation* (MJO)**

```
%Halmar Halide
%Lab. Hidrometeorologi, Dept. Geofisika Unhas
%Tugas Akhir: Wikal (H061201079)
clear
clf
clc
%Memuat Data & Menginisialisasi Variabel
load mjo_australia.txt
wheat= mjo_australia(:,1); %Data produksi gandum
mjo= mjo_australia(:,2:end); %Data MJO
%Plot Data Produksi Gandum & Polinomial Fitting
y=mjo_australia(:,4);prod=mjo_australia(:,1);
meanProd=mean(wheat)%rata-rata produksi gandum
year=1982:2022;year=year';
[baris,kolom]=size(y);
opol = 3;
[p,s] = polyfit(year,wheat,opol);%fitting polinomial
f_y = polyval(p,year,s);%nilai prediksi dari fitting
dt_prod = prod - f_y;%anomali produksi (deviasi dari tren)
%dt_prod=prod;
figure(1)
plot(year,prod,'o',year,f_y)
ylabel('Produksi Gandum (gr/ha)')
xlabel('Tahun')
%Normalisasi Anomali Produksi Gandum
mprod=mean(dt_prod); %rata-rata anomali produksi
sprod=std(dt_prod); %standar deviasi anomali produksi
aprod=(dt_prod-mprod)./sprod; %normalisasi anomali produksi
yy = prctile(aprod,[33.33 66.67]); %perhitungan persentil
low_limit=yy(1,1); %batas bawah
up_limit=yy(1,2); %batas atas
%Plot Anomali Produksi Gandum Terstandar
atas=up_limit.*ones(baris); %garis batas atas
bawah=low_limit.*ones(baris);%garis batas bawah
figure(2)
subplot(121),plot(year,prod,'o',year,f_y),hold on
legend('Observasi','Polinomial orde 2','Location','NorthWest')
text(2014,50,'(a)')
ylabel('Produksi Gandum (gr/ha)')
xlabel('Tahun'),hold off
subplot(122),plot(year,aprod,year,atas,':g',year,bawah,':r','LineWidth'
,2), hold on
ylabel('Anomali Produksi Gandum Terstandar')
text(2014,-1.7,'(b)')
xlabel('Tahun'),hold off
%exitt
%Menghitung Kategori Berdasarkan MJO dan Anomali Produksi Gandum
```

```
figure(3)
mjo=y;
x=0.5:2;y=-2.5:2.5;
n=baris;
A=zeros(n,1); %inisialisasi matriks untuk kategori A
for m=1:n; %loop untuk kategori A
    if mjo(m,1)<-0.14
        if aprod(m,1)<low_limit
          A(m,1)=1;
        end
    end
end
A1=sum(A); %jumlah kejadian di kategori A
B=zeros(n,1);
for m=1:n;
    if mjo(m,1)>=-0.14 & mjo(m,1)<=0.05
        if aprod(m,1)<low_limit
          B(m,1)=1;
        end
    end
end
B1=sum(B);
C=zeros(n,1);
for m=1:n;
    if mjo(m,1)>0.05
        if aprod(m,1)<low_limit
          C(m,1)=1;
        end
    end
end
C1=sum(C);
D=zeros(n,1);
for m=1:n;
    if mjo(m,1)<-0.14
        if aprod(m,1)>=low_limit & aprod(m,1)<=up_limit
          D(m,1)=1;
        end
    end
end
D1=sum(D);
E=zeros(n,1);
for m=1:n;
    if mjo(m,1)>=-0.14 & mjo(m,1)<=0.05
        if aprod(m,1)>low_limit & aprod(m,1)<up_limit
          E(m,1)=1;
        end
    end
end
E1=sum(E);
```

```
F=zeros(n,1);
for m=1:n;
    if mjo(m,1)>0.05
        if aprod(m,1)>=low_limit & aprod(m,1)<=up_limit
          F(m,1)=1;
        end
    end
end
F1=sum(F);
G=zeros(n,1);
for m=1:n;
    if mjo(m,1)<-0.14
        if aprod(m,1)>up_limit
          G(m,1)=1;
        end
    end
end
G1=sum(G);
H=zeros(n,1);
for m=1:n;
    if mjo(m,1)>=-0.14 & mjo(m,1)<=0.05
        if aprod(m,1)>up_limit
          H(m,1)=1;
        end
    end
end
H1=sum(H);
I=zeros(n,1);
for m=1:n;
    if mjo(m,1)>0.05
        if aprod(m,1)>up_limit
          I(m,1)=1;
        end
    end
end
I1=sum(I);
%Menghitung Persentase Kejadian Setiap kategori
ADG1=(A1+D1+G1);BEH1=(B1+E1+H1);CFI1=(C1+F1+I1); %total kategori
PA=A1/ADG1*100; %persentase kategori A
PB=B1/BEH1*100;
PC=C1/CFI1*100;
PD=D1/ADG1*100;
PE=E1/BEH1*100;
PF=F1/CFI1*100;
PG=G1/ADG1*100;
PH=H1/BEH1*100;
PI=I1/CFI1*100;
PADG=PA+PD+PG;
PBEH=PB+PE+PH;
```

```
p=[PG PH PI;PD PE PF;PA PB PC]; %menggabungkan persentase ke dalam satu
matriks
%Fitting Polinomial Antara MJO dan Anomali Produksi Terstandar
opol1 = 1; %orde 1 untuk regresi linier sederhana
[p1,s1] = polyfit(mjo,aprod,opol1); %fitting polinomial
gradien=p1(1,1) %gradien hasil regresi
kons=p1(1,2) %konstanta hasil regresi
[f_y1,delta] = polyval(p1,mjo,s1); %nilai prediksi dan error fitting
mjocontoh=[0.5 2];
[Y,delta] = polyval(p1,mjocontoh,s1);
%Menghitung Anomali Produksi Berdasarkan Prediksi
Yup=[Y+delta]; %batas atas prediksi
Ylow=[Y-delta] %batas bawah prediksi
%exitt
anom_max=Yup*sprod
anom_mean=Y*sprod
anom_min=Ylow*sprod
%Menghitung Total Kejadian dan Nilai Percent Correct (PC)
Total=A1+B1+C1+D1+E1+F1+G1+H1+I1
Percent_Correct=100*(G1+E1+C1)/Total
%Plot Hasil Fitting dan Anomali Produksi
plot(mjo,aprod,'o',mjo,f_y1,'linewidth',2)
xlabel('MJO')
ylabel('Standardized Wheat Production Anomaly')
title('Wheat Production vs MJO MAM 1982-2022 (n=41, PC=46.34)')
text(-0.63,2.65,'ANOMSTD=-0.5196 * MJO + 0.0368')
axis('square')
axis([-1.0 1.0 -3.0 3.0])
grid on

%Mengatur Label Sumbu X dan Y pada Plot
set(gca,'Xtick',[-1.0,-0.14,0.05,1.0])
set(gca,'Ytick',[-3.0,low_limit,up_limit,3.0])
%Menambahkan Teks pada Plot untuk Masing-masing Kategori
text(-0.67,-1.7,[num2str(PA,'%.2f'),'%'])
text(-0.67,-1.5,[num2str(A1)])
text(-0.67,0.1,[num2str(PD,'%.2f'),'%'])
text(-0.67,0.3,[num2str(D1)])
text(-0.67,1.7,[num2str(PG,'%.2f'),'%'])
text(-0.67,1.9,[num2str(G1)])
text(-0.175,-1.7,[num2str(PB,'%.2f'),'%'])
text(-0.175,-1.5,[num2str(B1)])
text(-0.175,0.1,[num2str(PE,'%.2f'),'%'])
text(-0.175,0.3,[num2str(E1)])
text(-0.175,1.7,[num2str(PH,'%.2f'),'%'])
text(-0.175,1.9,[num2str(H1)])
text(0.40,-1.7,[num2str(PC,'%.2f'),'%'])
text(0.40,-1.5,[num2str(C1)])
text(0.40,0.1,[num2str(PF,'%.2f'),'%'])
```

```
text(0.40,0.3,[num2str(F1)])
text(0.40,1.7,[num2str(PI,'%.2f'),'%'])
text(0.40,1.9,[num2str(I1)])
%exitt
```

***El-Niño Southern Oscillation* (ENSO)**

```
%Halmar Halide
%Lab. Hidrometeorologi, Dept. Geofisika Unhas
%Tugas Akhir: Wikal (H061201079)
clear
clf
clc
%Memuat Data & Menginisialisasi Variabel
load enso_australia.txt
wheat= enso_australia(:,1); %Data produksi gandum
enso= enso_australia(:,2:end); %Data ENSO
%Plot Data Produksi Gandum & Polinomial Fitting
y=enso_australia(:,11);prod=enso_australia(:,1);
meanProd=mean(wheat)%rata-rata produksi gandum
year=1982:2022;year=year';
[baris,kolom]=size(y);
opol = 3;
[p,s] = polyfit(year,wheat,opol);%fitting polinomial
f_y = polyval(p,year,s);
dt_prod = prod - f_y; %anomali produksi
%dt_prod=prod;
figure(1)
plot(year,prod,'o',year,f_y)
ylabel('Produksi Gandum (gr/ha)')
xlabel('Tahun')
%Normalisasi Anomali Produksi Gandum
mprod=mean(dt_prod); %rata-rata anomali produksi
sprod=std(dt_prod); %standar deviasi anomali produksi
aprod=(dt_prod-mprod)./sprod; %normalisasi anomali produksi
yy = prctile(aprod,[33.33 66.67]); %perhitungan persentil
low_limit=yy(1,1); %batas bawah
up_limit=yy(1,2); %batas atas
%Plot Anomali Produksi Gandum Terstandar
atas=up_limit.*ones(baris); %garis batas atas
bawah=low_limit.*ones(baris);%garis batas bawah
figure(2)
subplot(121),plot(year,prod,'o',year,f_y),hold on
legend('Observasi','Polinomial orde 2','Location','NorthWest')
text(2014,50,'(a)')
ylabel('Produksi Gandum (gr/ha)')
xlabel('Tahun'),hold off
subplot(122),plot(year,aprod,year,atas,':g',year,bawah,':r','LineWidth'
,2), hold on
ylabel('Anomali Produksi Gandum Terstandar')
```

```
text(2014,-1.7,'(b)')
xlabel('Tahun'),hold off
%exitt
%Menghitung Kategori Berdasarkan ENSO dan Anomali Produksi Gandum
figure(3)
enso=y;
x=0.5:2;y=-2.5:2.5;
n=baris;
A=zeros(n,1); %inisialisasi matriks untuk kategori A
for m=1:n; %loop untuk kategori A
    if enso(m,1)<-0.5
        if aprod(m,1)<low_limit
          A(m,1)=1;
        end
    end
end
A1=sum(A); %jumlah kejadian di kategori A
B=zeros(n,1);
for m=1:n;
    if enso(m,1)>=-0.5 & enso(m,1)<=0.5
        if aprod(m,1)<low_limit
          B(m,1)=1;
        end
    end
end
B1=sum(B);
C=zeros(n,1);
for m=1:n;
    if enso(m,1)>0.5
        if aprod(m,1)<low_limit
          C(m,1)=1;
        end
    end
end
C1=sum(C);
D=zeros(n,1);
for m=1:n;
    if enso(m,1)<-0.5
        if aprod(m,1)>=low_limit & aprod(m,1)<=up_limit
          D(m,1)=1;
        end
    end
end
D1=sum(D);
E=zeros(n,1);
for m=1:n;
    if enso(m,1)>=-0.5 & enso(m,1)<=0.5
        if aprod(m,1)>low_limit & aprod(m,1)<up_limit
          E(m,1)=1;
```

```
        end
    end
end
E1=sum(E);
F=zeros(n,1);
for m=1:n;
    if enso(m,1)>0.5
        if aprod(m,1)>=low_limit & aprod(m,1)<=up_limit
          F(m,1)=1;
        end
    end
end
F1=sum(F);
G=zeros(n,1);
for m=1:n;
    if enso(m,1)<-0.5
        if aprod(m,1)>up_limit
          G(m,1)=1;
        end
    end
end
G1=sum(G);
H=zeros(n,1);
for m=1:n;
    if enso(m,1)>=-0.5 & enso(m,1)<=0.5
        if aprod(m,1)>up_limit
          H(m,1)=1;
        end
    end
end
H1=sum(H);
I=zeros(n,1);
for m=1:n;
    if enso(m,1)>0.5
        if aprod(m,1)>up_limit
          I(m,1)=1;
        end
    end
end
I1=sum(I);
%Menghitung Persentase Kejadian Setiap kategori
ADG1=(A1+D1+G1);BEH1=(B1+E1+H1);CFI1=(C1+F1+I1); %total kategori
PA=A1/ADG1*100; %persentase kategori A
PB=B1/BEH1*100;
PC=C1/CFI1*100;
PD=D1/ADG1*100;
PE=E1/BEH1*100;
PF=F1/CFI1*100;
PG=G1/ADG1*100;
```

```
PH=H1/BEH1*100;
PI=I1/CFI1*100;
PADG=PA+PD+PG;
PBEH=PB+PE+PH;
p=[PG PH PI;PD PE PF;PA PB PC]; %menggabungkan persentase ke dalam satu
matriks
%Fitting Polinomial Antara ENSO dan Anomali Produksi Terstandar
opol1 = 1;
[p1,s1] = polyfit(enso,aprod,opol1); %fitting polinomial
gradien=p1(1,1) %gradien
kons=p1(1,2) %konstanta
[f_y1,delta] = polyval(p1,enso,s1); %nilai prediksi dan error fitting
ensocontoh=[0.5 2];
[Y,delta] = polyval(p1,ensocontoh,s1);
%Menghitung Anomali Produksi Berdasarkan Prediksi
Yup=[Y+delta]; %batas atas prediksi
Ylow=[Y-delta] %batas bawah prediksi
%exitt
anom_max=Yup*sprod
anom_mean=Y*sprod
anom_min=Ylow*sprod
%Menghitung Total Kejadian dan Nilai Percent Correct (PC)
Total=A1+B1+C1+D1+E1+F1+G1+H1+I1
Percent_Correct=100*(G1+E1+C1)/Total
%Plot Hasil Fitting dan Anomali Produksi
plot(enso,aprod,'o',enso,f_y1,'linewidth',2)
xlabel('ENSO (°C) ')
ylabel('Standardized Wheat Production Anomaly')
title('Wheat Production vs ENSO OND 1982-2022 (n=41, PC=46.34)')
text(-2.0,2.65,'ANOMSTD=0.0733 * ENSO + 0.0045')
axis('square')
axis([-3.0 3.0 -3.0 3.0])
grid on

%Mengatur Label Sumbu X dan Y pada Plot
set(gca,'Xtick',[-3.0,-0.5,0.5,3.0])
set(gca,'Ytick',[-3,low_limit,up_limit,3])
%Menambahkan Teks pada Plot untuk Masing-masing Kategori
text(-2.05,-1.5,[num2str(PA,'%.2f'),'%'])
text(-2.05,-1.25,[num2str(A1)])
text(-2.05,0.1,[num2str(PD,'%.2f'),'%'])
text(-2.05,0.3,[num2str(D1)])
text(-2.05,1.6,[num2str(PG,'%.2f'),'%'])
text(-2.05,1.8,[num2str(G1)])
text(-.38,-1.5,[num2str(PB,'%.2f'),'%'])
text(-.38,-1.25,[num2str(B1)])
text(-.38,0.1,[num2str(PE,'%.2f'),'%'])
text(-.38,0.3,[num2str(E1)])
text(-.38,1.6,[num2str(PH,'%.2f'),'%'])
```

```
text(-.38,1.8,[num2str(H1)])
text(1.27,-1.5,[num2str(PC,'%.2f'),'%'])
text(1.27,-1.25,[num2str(C1)])
text(1.27,0.1,[num2str(PF,'%.2f'),'%'])
text(1.27,0.3,[num2str(F1)])
text(1.27,1.6,[num2str(PI,'%.2f'),'%'])
text(1.27,1.8,[num2str(I1)])
%exitt
```

Monsoon

```
%Halmar Halide
%Lab. Hidrometeorologi, Dept. Geofisika Unhas
%Tugas Akhir: Wikal (H061201079)
clear
clf
clc
%Memuat Data & Menginisialisasi Variabel
load monsoon_australia.txt
wheat= monsoon_australia(:,1); %Data produksi gandum
monsoon= monsoon_australia(:,2); %Data Monsoon
%Plot Data Produksi Gandum & Polinomial Fitting
y=monsoon_australia(:,2);prod=monsoon_australia(:,1);
meanProd=mean(wheat)%rata-rata produksi gandum
year=1982:2022;year=year';
[baris,kolom]=size(y);
opol = 3;
[p,s] = polyfit(year,wheat,opol);%fitting polinomial
f_y = polyval(p,year,s);
dt_prod = prod - f_y; %anomali produksi
%dt_prod=prod;
figure(1)
plot(year,prod,'o',year,f_y)
ylabel('Produksi Gandum (gr/ha)')
xlabel('Tahun')
%Normalisasi Anomali Produksi Gandum
mprod=mean(dt_prod); %rata-rata anomali produksi
sprod=std(dt_prod); %standar deviasi anomali produksi
aprod=(dt_prod-mprod)./sprod; %normalisasi anomali produksi
yy = prctile(aprod,[33.33 66.67]); %perhitungan persentil
low_limit=yy(1,1); %batas bawah
up_limit=yy(1,2); %batas atas
%Plot Anomali Produksi Gandum Terstandar
atas=up_limit.*ones(baris); %garis batas atas
bawah=low_limit.*ones(baris);%garis batas bawah
figure(2)
subplot(121),plot(year,prod,'o',year,f_y),hold on
legend('Observasi','Polinomial orde 2','Location','NorthWest')
text(2014,50,'(a)')
ylabel('Produksi Gandum (gr/ha)')
```

```
xlabel('Tahun'),hold off
subplot(122),plot(year,aprod,year,atas,':g',year,bawah,':r','LineWidth'
,2), hold on
ylabel('Anomali Produksi Gandum Terstandar')
text(2014,-1.7,'(b)')
xlabel('Tahun'),hold off
%exitt
%Menghitung Kategori Berdasarkan Monsoon dan Anomali Produksi Gandum
figure(3)
monsoon=y;
x=0.5:2;y=-2.5:2.5;
n=baris;
A=zeros(n,1); %inisialisasi matriks untuk kategori A
for m=1:n; %loop untuk kategori A
    if monsoon(m,1)<-0.82
        if aprod(m,1)<low_limit
          A(m,1)=1;
        end
    end
end
A1=sum(A); %jumlah kejadian di kategori A
B=zeros(n,1);
for m=1:n;
    if monsoon(m,1)>=-0.82 & monsoon(m,1)<=0.28
        if aprod(m,1)<low_limit
          B(m,1)=1;
        end
    end
end
B1=sum(B);
C=zeros(n,1);
for m=1:n;
    if monsoon(m,1)>0.28
        if aprod(m,1)<low_limit
          C(m,1)=1;
        end
    end
end
C1=sum(C);
D=zeros(n,1);
for m=1:n;
    if monsoon(m,1)<-0.82
        if aprod(m,1)>=low_limit & aprod(m,1)<=up_limit
          D(m,1)=1;
        end
    end
end
D1=sum(D);
E=zeros(n,1);
```

```
for m=1:n;
    if monsoon(m,1)>=-0.82 & monsoon(m,1)<=0.28
        if aprod(m,1)>low_limit & aprod(m,1)<up_limit
          E(m,1)=1;
        end
    end
end
E1=sum(E);
F=zeros(n,1);
for m=1:n;
    if monsoon(m,1)>0.28
        if aprod(m,1)>=low_limit & aprod(m,1)<=up_limit
          F(m,1)=1;
        end
    end
end
F1=sum(F);
G=zeros(n,1);
for m=1:n;
    if monsoon(m,1)<-0.82
        if aprod(m,1)>up_limit
          G(m,1)=1;
        end
    end
end
G1=sum(G);
H=zeros(n,1);
for m=1:n;
    if monsoon(m,1)>=-0.82 & monsoon(m,1)<=0.28
        if aprod(m,1)>up_limit
          H(m,1)=1;
        end
    end
end
H1=sum(H);
I=zeros(n,1);
for m=1:n;
    if monsoon(m,1)>0.28
        if aprod(m,1)>up_limit
          I(m,1)=1;
        end
    end
end
I1=sum(I);
%Menghitung Persentase Kejadian Setiap kategori
ADG1=(A1+D1+G1);BEH1=(B1+E1+H1);CFI1=(C1+F1+I1); %total kategori
PA=A1/ADG1*100; %persentase kategori A
PB=B1/BEH1*100;
PC=C1/CFI1*100;
```

```
PD=D1/ADG1*100;
PE=E1/BEH1*100;
PF=F1/CFI1*100;
PG=G1/ADG1*100;
PH=H1/BEH1*100;
PI=I1/CFI1*100;
PADG=PA+PD+PG;
PBEH=PB+PE+PH;
PCFI=PC+PF+PI;
p=[PG PH PI;PD PE PF;PA PB PC]; %menggabungkan persentase ke dalam satu
matriks
%Fitting Polinomial Antara Monsoon dan Anomali Produksi Terstandar
opol1 = 1;
[p1,s1] = polyfit(monsoon,aprod,opol1); %fitting polinomial
gradien=p1(1,1) %gradien
kons=p1(1,2) %konstanta
[f_y1,delta] = polyval(p1,monsoon,s1); %nilai prediksi dan error
fitting
monsooncontoh=[0.5 2];
[Y,delta] = polyval(p1,monsooncontoh,s1);
%Menghitung Anomali Produksi Berdasarkan Prediksi
Yup=[Y+delta]; %batas atas prediksi
Ylow=[Y-delta] %batas bawah prediksi
%exitt
anom_max=Yup*sprod
anom_mean=Y*sprod
anom_min=Ylow*sprod
%Menghitung Total Kejadian dan Nilai Percent Correct (PC)
Total=A1+B1+C1+D1+E1+F1+G1+H1+I1
Percent_Correct=100*(G1+E1+C1)/Total
%Plot Hasil Fitting dan Anomali Produksi
plot(monsoon,aprod,'o',monsoon,f_y1,'linewidth',2)
xlabel('Monsoon (m/s) ')
ylabel('Standardized Wheat Production Anomaly')
title('Wheat Production vs Monsoon JJA 1982-2022 (n=41, PC=34.14)')
text(-1.85,2.65,'ANOMSTD=0.1238 * Monsoon + 0.0292')
axis('square')
axis([-2.5 2.0 -3.0 3.0])
grid on

%Mengatur Label Sumbu X dan Y pada Plot
set(gca,'Xtick',[-2.5,-0.82,0.28,2.0])
set(gca,'Ytick',[-3.0,low_limit,up_limit,3.0])
%Menambahkan Teks pada Plot untuk Masing-masing Kategori
text(-1.85,-1.5,[num2str(PA,'%.2f'),'%'])
text(-1.85,-1.25,[num2str(A1)])
text(-1.85,0.1,[num2str(PD,'%.2f'),'%'])
text(-1.85,0.3,[num2str(D1)])
text(-1.85,1.6,[num2str(PG,'%.2f'),'%'])
```

```
text(-1.85,1.8,[num2str(G1)])
text(-0.54,-1.5,[num2str(PB,'%.2f'),'%'])
text(-0.54,-1.25,[num2str(B1)])
text(-0.54,0.1,[num2str(PE,'%.2f'),'%'])
text(-0.54,0.3,[num2str(E1)])
text(-0.54,1.6,[num2str(PH,'%.2f'),'%'])
text(-0.54,1.8,[num2str(H1)])
text(0.85,-1.5,[num2str(PC,'%.2f'),'%'])
text(0.85,-1.25,[num2str(C1)])
text(0.85,0.1,[num2str(PF,'%.2f'),'%'])
text(0.85,0.3,[num2str(F1)])
text(0.85,1.6,[num2str(PI,'%.2f'),'%'])
text(0.85,1.8,[num2str(I1)])
%exitt
```

Kuantil Prediktor

```
% Script untuk mengkategorisasikan data MJO berdasarkan persentil dan
menampilkan batas-batasnya
% 1. Muat data dari file txt menggunakan readtable
dataTable = readtable('kuantilmjo.txt');
% 2. Konversi tabel ke array numerik, jika data berupa angka
data = table2array(dataTable(:, 2:end));  % Asumsi data numerik ada
dari kolom ke-2 ke belakang
% 3. Hitung persentil untuk membagi data menjadi tiga kategori
p33 = prctile(data(:), 33);  % Batas atas untuk MJO lemah (33% dari
data)
p66 = prctile(data(:), 66);  % Batas atas untuk MJO aktif (66% dari
data)
% 4. Tampilkan nilai persentil 33% dan 66% dari data sebagai detail
tambahan
percentile33 = 100 * length(find(data(:) <= p33)) / length(data(:)); %
Menghitung persentase di bawah p33
percentile66 = 100 * length(find(data(:) <= p66)) / length(data(:)); %
Menghitung persentase di bawah p66
% 5. Tampilkan batasan numerik untuk setiap kategori
disp(['Batas 33% dari data: ', num2str(p33), ' (MJO Lemah)']);
disp(['Batas 66% dari data: ', num2str(p66), ' (MJO Aktif)']);
disp(['MJO Lemah: Nilai kurang dari ', num2str(p33), ' (hingga
persentil ke-', num2str(percentile33), '%)']);
disp(['MJO Aktif: Nilai antara ', num2str(p33), ' dan ', num2str(p66),
' (antara persentil ke-', num2str(percentile33), '% dan ',
num2str(percentile66), '%)']);
disp(['MJO Kuat: Nilai lebih dari ', num2str(p66), ' (lebih dari
persentil ke-', num2str(percentile66), '%)']);
```