

DAFTAR PUSTAKA

- Amalutfia, S. Y., & Hafiyusholeh, M. (2020). Analisis Peramalan Nilai Tukar Rupiah Terhadap Dollar dan Yuan Menggunakan FTS-Markov Chain. 2(2), 102.
<https://doi.org/10.30736/vj.v2i2.258>
- BPS Brebes. (2022). *Survei Harga Produsen Beras (SHP-BG) 2022 di Kabupaten Brebes*.
- Cahyani, F. E. N. (2021). Perbandingan Metode Fuzzy Chen, Fuzzy Cheng Dan Fuzzy Markov Chain Pada Peramalan Harga Pasar Bahan Pokok Di Kabupaten Lamongan.
- Fajari, D. A., Abyantara, M. F., & Lingga, H. A. (2021). Peramalan Rata-Rata Harga Beras Pada Tingkat Perdagangan Besar Atau Grosir Indonesia Dengan Metode Sarima (Seasonal Arima). *Jurnal Agribisnis Terpadu*, 14(1), 88.
<https://doi.org/10.33512/jat.v14i1.11460>
- Febriyanti, A. (2020). Penerapan Metode Fuzzy Time Series Chen Dan Cheng Dalam Peramalan Rata-Rata Harga Beras Ditingkat Perdagangan Besar (Grosir) Di Indonesia.
- Haerani, E. (2013). Analisa Kendali Logika Fuzzy Dengan Metode Defuzzifikasi COA (Center Of Area), Bisektor , MOM (Mean Of Maximum), LOM (Largest Of Maximum), Dan SOM (Smallest Of Maximum). 10.
- Hansun, S., & Nusantara, U. M. (2012). Peramalan Data IHSG Menggunakan Fuzzy Time Series 1. 6(2), 79–88.
- Jatipaningrum, M. T. (2016). Peramalan Data Produk Domestik Bruto dengan Fuzzy Time Series Markov Chain. *Jurnal Teknologi*, 9(1), 31–38.
- Lestari, Nofinda; Wahyuningsih, N. (2012). Peramalan Kunjungan Wisata dengan Pendekatan Model SARIMA (Studi kasus : Kusuma Agrowisata). *Jurnal Sains Dan Seni ITS*, 1(Vol 1, No 1 (2012): Jurnal Sains dan Seni ITS (ISSN 2301-928X)), A29–A33.
- Margi S, K., & Pendawa, S. (2015). Analisa Dan Penerapan Metode Single Exponential Smoothing Untuk Prediksi Penjualan Pada Periode Tertentu (Studi Kasus: PT.Media Cemara Kreasi). *Prosiding SNATIF*, 1998, 259–266.
- Montgomery, D. C., Jennings, C. L., & Kulahci, M. (2015). Introduction Time Series Analysis and Forecasting. 671.
- Muhammad, M. (2016). Sebaran Dan Peramalan Mahasiswa Baru Pendidikan Matematika Universitas Muhammadiyah Purwokerto Dengan Metode Time Invariant Fuzzy Time Series. *Matematika Jurnal*, 3(2), 48–58.
- Mustika, L. N. (2021). Perbandingan Metode Fuzzy Time Series Cheng Dan Markov Chain

- Pada Peramalan Nilai Tukar Petani (NTP) Di Indonesia. Universitas Islam Negeri Maulana Malik Ibrahim Malang.
- Nasution, H. (2012). Implementasi Logika Fuzzy pada Sistem Kecerdasan Buatan. 4(2), 4–8.
- Rachman, B., Agustian, A., & Syaifudin, A. (2017). Implikasi Kebijakan Harga Eceran Tertinggi Beras Terhadap Profitabilitas Usaha Tani Padi Dan Harga, Kualitas, Serta Serapan Beras. 17(1), 59–77.
- Ratnawati. (2019). Prediksi Harga Beras Dengan Metode Fuzzy Time Series Menggunakan Metode Model Chen Dan Markov Chain(Studi Kasus : Kota Tanjungpinang). Universitas Maritim Raja Ali Haji Tanjungpinang.
- Saelan, A. (2009). Logika Fuzzy. 13508029, 1–5.
- Safitri, Y., Wahyuningsih, S., & Goejantoro, R. (2018). Peramalan dengan Metode Fuzzy Time Series Markov Chain (Studi Kasus : Harga Penutupan Saham PT . Radiant Utama Interinsco Tbk Periode Januari 2011 – Maret 2017). *Jurnal Eksponensial*, 9(1), 51–58. <http://jurnal.fmipa.unmul.ac.id/index.php/exponensial/article/view/275/127>
- Sari, R. K. (2014). Analisis Impor Beras Di Indonesia. *Economics Development Analysis Journal*, 3(2), 320–326. <https://doi.org/10.15294/edaj.v3i2.3838>
- Sihombing, P. R., & Arsani, A. M. (2021). Comparison of Machine Learning Methods in Classifying Poverty in Indonesia in 2018. *Jurnal Teknik Informatika (Jutif)*, 2(1), 51–56. <https://doi.org/10.20884/1.jutif.2021.2.1.52>
- Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif Dan R&D* (26th ed.). Alfabeta,Bandung.
- Sukiyono, K., & Rosdiana, R. (2018). Pendugaan Model Peramalan Harga Beras Pada Tingkat Grosir. *Jurnal AGRISEP*, 17(1), 23–30. <https://doi.org/10.31186/jagrisep.17.1.23-30>
- Tsaur, R.-C. (2012). A Fuzzy Time Series-Markov Chain Model With An Application To Forecast The Exchange Rate Between The Taiwan And Us Dollar. *Journal, International Computing, Innovative*, 8(7), 4931–4942.

LAMPIRAN

Lampiran A Data Training

Data aktual		
T	Bulan/tahun	Harga Beras (Rp)
1	Jan-14	8.208,79
2	Feb-14	8.303,23
3	Mar-14	8.192,87
4	Apr-14	7.919,93
5	May-14	8.009,43
6	Jun-14	8.167,57
7	Jul-14	8.228,30
8	Aug-14	8.329,47
9	Sep-14	8.310,51
10	Oct-14	8.396,86
11	Nov-14	8.555,14
12	Dec-14	9.018,39
13	Jan-15	9.723,46
14	Feb-15	9.784,70
15	Mar-15	9.571,84
16	Apr-15	9.127,77
17	May-15	8.709,81
18	Jun-15	8.915,36
19	Jul-15	8.945,11
20	Aug-15	9.126,78
21	Sep-15	9.444,06
22	Oct-15	9.455,01
23	Nov-15	9.564,26
24	Dec-15	9.663,57
25	Jan-16	9.723,46
26	Feb-16	9.784,70
27	Mar-16	9.571,84
28	Apr-16	9.127,77
29	May-16	9.181,93
30	Jun-16	9.354,34
31	Jul-16	9.374,37
32	Aug-16	9.367,30
33	Sep-16	9.110,58
34	Oct-16	9.132,58
35	Nov-16	9.257,36
36	Dec-16	9.341,58
37	Jan-17	9.431,37
38	Feb-17	9.408,39
39	Mar-17	9.388,53

T	Bulan/tahun	Harga Beras (Rp)
40	Apr-17	9.324,60
41	May-17	9.436,19
42	Jun-17	9.444,28
43	Jul-17	9.383,68
44	Aug-17	9.436,74
45	Sep-17	9.470,59
46	Oct-17	9.502,67
47	Nov-17	9.538,75
48	Dec-17	9.860,39
49	Jan-18	10.349,91
50	Feb-18	10.381,74
51	Mar-18	9.892,56
52	Apr-18	9.524,96
53	May-18	9.523,88
54	Jun-18	9.478,05
55	Jul-18	9.519,93
56	Aug-18	9.458,07
57	Sep-18	9.572,03
58	Oct-18	9.645,30
59	Nov-18	9.770,97
60	Dec-18	9.818,07
61	Jan-19	10.111,08
62	Feb-19	10.007,91
63	Mar-19	9.814,53
64	Apr-19	9.464,68
65	May-19	9.462,05
66	Jun-19	9.515,51
67	Jul-19	9.519,35
68	Aug-19	9.530,00
69	Sep-19	9.594,39
70	Oct-19	9.659,17
71	Nov-19	9.742,16
72	Dec-19	9.838,26
73	Jan-20	10.032,66
74	Feb-20	10.080,81
75	Mar-20	10.082,43
76	Apr-20	10.018,19
77	May-20	9.826,63
78	Jun-20	9.918,95
79	Jul-20	9.931,71
80	Aug-20	9.962,65
81	Sep-20	9.871,12
82	Oct-20	9.812,90

Lampiran B Data Testing

T	Bulan/tahun	Harga Beras (Rp)
83	Nov-20	9.714,50
84	Dec-20	9.787,86
85	Jan-21	9.780,19
86	Feb-21	9.772,10
87	Mar-21	9.606,97
88	Apr-21	9.549,76
89	May-21	9.627,08
90	Jun-21	9.537,16
91	Jul-21	9.401,61
92	Aug-21	9.499,36
93	Sep-21	9.455,56
94	Oct-21	9.449,47
95	Nov-21	9.539,29
96	Dec-21	9.672,54
97	Jan-22	9.824,23
98	Feb-22	9.826,88
99	Mar-22	9.786,63
100	Apr-22	9.576,75
101	May-22	9.512,63
102	Jun-22	9.497,40
103	Jul-22	9.628,57

Lampiran C Fuzzifikasi dan FLR

T	Bulan/tahun	Harga Beras (Rp)	Fuzzifikasi	FLR
1	Jan-14	8.208,79	A2	-
2	Feb-14	8.303,23	A2	A2->A2
3	Mar-14	8.192,87	A2	A2->A2
4	Apr-14	7.919,93	A1	A2->A1
5	May-14	8.009,43	A1	A1->A1
6	Jun-14	8.167,57	A2	A1->A2
7	Jul-14	8.228,30	A2	A2->A2
8	Aug-14	8.329,47	A2	A2->A2
9	Sep-14	8.310,51	A2	A2->A2
10	Oct-14	8.396,86	A2	A2->A2
11	Nov-14	8.555,14	A3	A2->A3
12	Dec-14	9.018,39	A4	A3->A4
13	Jan-15	9.723,46	A6	A4->A6
14	Feb-15	9.784,70	A6	A6->A6

T	Bulan/tahun	Harga Beras (Rp)	Fuzzifikasi	FLR
15	Mar-15	9.571,84	A6	A6->A6
16	Apr-15	9.127,77	A4	A6->A4
17	May-15	8.709,81	A3	A4->A3
18	Jun-15	8.915,36	A4	A3->A4
19	Jul-15	8.945,11	A4	A4->A4
20	Aug-15	9.126,78	A4	A4->A4
21	Sep-15	9.444,06	A5	A4->A5
22	Oct-15	9.455,01	A5	A5->A5
23	Nov-15	9.564,26	A6	A5->A6
24	Dec-15	9.663,57	A6	A6->A6
25	Jan-16	9.723,46	A6	A6->A6
26	Feb-16	9.784,70	A6	A6->A6
27	Mar-16	9.571,84	A6	A6->A6
28	Apr-16	9.127,77	A4	A6->A4
29	May-16	9.181,93	A4	A4->A4
30	Jun-16	9.354,34	A5	A4->A5
31	Jul-16	9.374,37	A5	A5->A5
32	Aug-16	9.367,30	A5	A5->A5
33	Sep-16	9.110,58	A4	A5->A4
34	Oct-16	9.132,58	A4	A4->A4
35	Nov-16	9.257,36	A5	A4->A5
36	Dec-16	9.341,58	A5	A5->A5
37	Jan-17	9.431,37	A5	A5->A5
38	Feb-17	9.408,39	A5	A5->A5
39	Mar-17	9.388,53	A5	A5->A5
40	Apr-17	9.324,60	A5	A5->A5
41	May-17	9.436,19	A5	A5->A5
42	Jun-17	9.444,28	A5	A5->A5
43	Jul-17	9.383,68	A5	A5->A5
44	Aug-17	9.436,74	A5	A5->A5
45	Sep-17	9.470,59	A5	A5->A5
46	Oct-17	9.502,67	A5	A5->A5
47	Nov-17	9.538,75	A5	A5->A5
48	Dec-17	9.860,39	A6	A5->A6
49	Jan-18	10.349,91	A8	A6->A8
50	Feb-18	10.381,74	A8	A8->A8
51	Mar-18	9.892,56	A6	A8->A6
52	Apr-18	9.524,96	A5	A6->A5
53	May-18	9.523,88	A5	A5->A5
54	Jun-18	9.478,05	A5	A5->A5
55	Jul-18	9.519,93	A5	A5->A5

T	Bulan/tahun	Harga Beras (Rp)	Fuzzifikasi	FLR
56	Aug-18	9.458,07	A5	A5->A5
57	Sep-18	9.572,03	A6	A5->A6
58	Oct-18	9.645,30	A6	A6->A6
59	Nov-18	9.770,97	A6	A6->A6
60	Dec-18	9.818,07	A6	A6->A6
61	Jan-19	10.111,08	A7	A6->A7
62	Feb-19	10.007,91	A7	A7->A7
63	Mar-19	9.814,53	A6	A7->A6
64	Apr-19	9.464,68	A5	A6->A5
65	May-19	9.462,05	A5	A5->A5
66	Jun-19	9.515,51	A5	A5->A5
67	Jul-19	9.519,35	A5	A5->A5
68	Aug-19	9.530,00	A5	A5->A5
69	Sep-19	9.594,39	A6	A5->A6
70	Oct-19	9.659,17	A6	A6->A6
71	Nov-19	9.742,16	A6	A6->A6
72	Dec-19	9.838,26	A6	A6->A6
73	Jan-20	10.032,66	A7	A6->A7
74	Feb-20	10.080,81	A7	A7->A7
75	Mar-20	10.082,43	A7	A7->A7
76	Apr-20	10.018,19	A7	A7->A7
77	May-20	9.826,63	A6	A7->A6
78	Jun-20	9.918,95	A7	A6->A7
79	Jul-20	9.931,71	A7	A7->A7
80	Aug-20	9.962,65	A7	A7->A7
81	Sep-20	9.871,12	A6	A7->A6
82	Oct-20	9.812,90	A6	A6->A6
83	Nov-20	9.714,50	A6	A6->A6
84	Dec-20	9.787,86	A6	A6->A6
85	Jan-21	9.780,19	A6	A6->A6
86	Feb-21	9.772,10	A6	A6->A6
87	Mar-21	9.606,97	A6	A6->A6
88	Apr-21	9.549,76	A5	A6->A5
89	May-21	9.627,08	A6	A5->A6
90	Jun-21	9.537,16	A5	A6->A5
91	Jul-21	9.401,61	A5	A5->A5
92	Aug-21	9.499,36	A5	A5->A5
93	Sep-21	9.455,56	A5	A5->A5
94	Oct-21	9.449,47	A5	A5->A5
95	Nov-21	9.539,29	A5	A5->A5
96	Dec-21	9.672,54	A6	A5->A6

T	Bulan/tahun	Harga Beras (Rp)	Fuzzifikasi	FLR
97	Jan-22	9.824,23	A6	A6->A6
98	Feb-22	9.826,88	A6	A6->A6
99	Mar-22	9.786,63	A6	A6->A6
100	Apr-22	9.576,75	A6	A6->A6
101	May-22	9.512,63	A5	A6->A5
102	Jun-22	9.497,40	A5	A5->A5
103	Jul-22	9.628,57	A6	A5->A6

Lampiran D Penerapan *Fuzzy Time Series* Markov Chain

T	Bulan/tahun	Harga Beras (Rp)	Fuzzifikasi	Peramalan Awal	Nilai Penyesuaian	Peramalan Akhir
1	Jan-14	8.208,79	A2	-	-	-
2	Feb-14	8.303,23	A2	8.339,37	0	8.339,37
3	Mar-14	8.192,87	A2	8.339,37	0	8.339,37
4	Apr-14	7.919,93	A1	8.339,37	-173,15	8.166,22
5	May-14	8.009,43	A1	8.166,22	0	8.166,22
6	Jun-14	8.167,57	A2	8.166,22	173,15	8.339,37
7	Jul-14	8.228,30	A2	8.339,37	0	8.339,37
8	Aug-14	8.329,47	A2	8.339,37	0	8.339,37
9	Sep-14	8.310,51	A2	8.339,37	0	8.339,37
10	Oct-14	8.396,86	A2	8.339,37	0	8.339,37
11	Nov-14	8.555,14	A3	8.339,37	173,15	8.512,51
12	Dec-14	9.018,39	A4	9.031,95	173,15	9.205,09
13	Jan-15	9.723,46	A6	9.185,85	346,29	9.532,14
14	Feb-15	9.784,70	A6	9.682,55	0	9.682,55
15	Mar-15	9.571,84	A6	9.682,55	0	9.682,55
16	Apr-15	9.127,77	A4	9.682,55	-346,29	9.336,26
17	May-15	8.709,81	A3	9.185,85	-173,15	9.012,71
18	Jun-15	8.915,36	A4	9.031,95	173,15	9.205,09
19	Jul-15	8.945,11	A4	9.185,85	0	9.185,85
20	Aug-15	9.126,78	A4	9.185,85	0	9.185,85
21	Sep-15	9.444,06	A5	9.185,85	173,15	9.359,00
22	Oct-15	9.455,01	A5	9.426,33	0	9.426,33
23	Nov-15	9.564,26	A6	9.426,33	173,15	9.599,48
24	Dec-15	9.663,57	A6	9.682,55	0	9.682,55
25	Jan-16	9.723,46	A6	9.682,55	0	9.682,55
26	Feb-16	9.784,70	A6	9.682,55	0	9.682,55
27	Mar-16	9.571,84	A6	9.682,55	0	9.682,55
28	Apr-16	9.127,77	A4	9.682,55	-346,29	9.336,26

T	Bulan/tahun	Harga Beras (Rp)	Fuzzifikasi	Peramalan Awal	Nilai Penyesuaian	Peramalan Akhir
29	May-16	9.181,93	A4	9.185,85	0	9.185,85
30	Jun-16	9.354,34	A5	9.185,85	173,15	9.359,00
31	Jul-16	9.374,37	A5	9.426,33	0	9.426,33
32	Aug-16	9.367,30	A5	9.426,33	0	9.426,33
33	Sep-16	9.110,58	A4	9.426,33	-173,15	9.253,19
34	Oct-16	9.132,58	A4	9.185,85	0	9.185,85
35	Nov-16	9.257,36	A5	9.185,85	173,15	9.359,00
36	Dec-16	9.341,58	A5	9.426,33	0	9.426,33
37	Jan-17	9.431,37	A5	9.426,33	0	9.426,33
38	Feb-17	9.408,39	A5	9.426,33	0	9.426,33
39	Mar-17	9.388,53	A5	9.426,33	0	9.426,33
40	Apr-17	9.324,60	A5	9.426,33	0	9.426,33
41	May-17	9.436,19	A5	9.426,33	0	9.426,33
42	Jun-17	9.444,28	A5	9.426,33	0	9.426,33
43	Jul-17	9.383,68	A5	9.426,33	0	9.426,33
44	Aug-17	9.436,74	A5	9.426,33	0	9.426,33
45	Sep-17	9.470,59	A5	9.426,33	0	9.426,33
46	Oct-17	9.502,67	A5	9.426,33	0	9.426,33
47	Nov-17	9.538,75	A5	9.426,33	0	9.426,33
48	Dec-17	9.860,39	A6	9.426,33	173,15	9.599,48
49	Jan-18	10.349,91	A8	9.682,55	346,29	10.028,84
50	Feb-18	10.381,74	A8	10.070,82	0	10.070,82
51	Mar-18	9.892,56	A6	10.070,82	-346,29	9.724,53
52	Apr-18	9.524,96	A5	9.682,55	-173,15	9.509,41
53	May-18	9.523,88	A5	9.426,33	0	9.426,33
54	Jun-18	9.478,05	A5	9.426,33	0	9.426,33
55	Jul-18	9.519,93	A5	9.426,33	0	9.426,33
56	Aug-18	9.458,07	A5	9.426,33	0	9.426,33
57	Sep-18	9.572,03	A6	9.426,33	173,15	9.599,48
58	Oct-18	9.645,30	A6	9.682,55	0	9.682,55
59	Nov-18	9.770,97	A6	9.682,55	0	9.682,55
60	Dec-18	9.818,07	A6	9.682,55	0	9.682,55
61	Jan-19	10.111,08	A7	9.682,55	173,15	9.855,70
62	Feb-19	10.007,91	A7	9.955,39	0	9.955,39
63	Mar-19	9.814,53	A6	9.955,39	-173,15	9.782,24
64	Apr-19	9.464,68	A5	9.682,55	173,15	9.855,70
65	May-19	9.462,05	A5	9.426,33	0	9.426,33
66	Jun-19	9.515,51	A5	9.426,33	0	9.426,33
67	Jul-19	9.519,35	A5	9.426,33	0	9.426,33
68	Aug-19	9.530,00	A5	9.426,33	0	9.426,33
69	Sep-19	9.594,39	A6	9.426,33	173,15	9.599,48

T	Bulan/tahun	Harga Beras (Rp)	Fuzzifikasi	Peramalan Awal	Nilai Penyesuaian	Peramalan Akhir
70	Oct-19	9.659,17	A6	9.682,55	0	9.682,55
71	Nov-19	9.742,16	A6	9.682,55	0	9.682,55
72	Dec-19	9.838,26	A6	9.682,55	0	9.682,55
73	Jan-20	10.032,66	A7	9.682,55	173,15	9.855,70
74	Feb-20	10.080,81	A7	9.955,39	0	9.955,39
75	Mar-20	10.082,43	A7	9.955,39	0	9.955,39
76	Apr-20	10.018,19	A7	9.955,39	0	9.955,39
77	May-20	9.826,63	A6	9.955,39	-173,15	9.782,24
78	Jun-20	9.918,95	A7	9.682,55	173,15	9.855,70
79	Jul-20	9.931,71	A7	9.955,39	0	9.955,39
80	Aug-20	9.962,65	A7	9.955,39	0	9.955,39
81	Sep-20	9.871,12	A6	9.955,39	-173,15	9.782,24
82	Oct-20	9.812,90	A6	9.682,55	0	9.682,55
83	Nov-20	9.714,50	A6	9.682,55	0	9.682,55
84	Dec-20	9.787,86	A6	9.682,55	0	9.682,55
85	Jan-21	9.780,19	A6	9.682,55	0	9.682,55
86	Feb-21	9.772,10	A6	9.682,55	0	9.682,55
87	Mar-21	9.606,97	A6	9.682,55	0	9.682,55
88	Apr-21	9.549,76	A5	9.682,55	-173,15	9.509,41
89	May-21	9.627,08	A6	9.426,33	0	9.426,33
90	Jun-21	9.537,16	A5	9.682,55	-173,15	9.509,41
91	Jul-21	9.401,61	A5	9.426,33	0	9.426,33
92	Aug-21	9.499,36	A5	9.426,33	0	9.426,33
93	Sep-21	9.455,56	A5	9.426,33	0	9.426,33
94	Oct-21	9.449,47	A5	9.426,33	0	9.426,33
95	Nov-21	9.539,29	A5	9.426,33	0	9.426,33
96	Dec-21	9.672,54	A6	9.426,33	173,15	9.599,48
97	Jan-22	9.824,23	A6	9.682,55	0	9.682,55
98	Feb-22	9.826,88	A6	9.682,55	0	9.682,55
99	Mar-22	9.786,63	A6	9.682,55	0	9.682,55
100	Apr-22	9.576,75	A6	9.682,55	0	9.682,55
101	May-22	9.512,63	A5	9.682,55	-173,15	9.509,41
102	Jun-22	9.497,40	A5	9.426,33	-173,15	9.253,19
103	Jul-22	9.628,57	A6	9.426,33	0	9.426,33

Lampiran E Tingkat Kesalahan Data Testing

[illegible]