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15.05.2020

ZAMAN SERİLERİ ANALİZİ

Örnek

	<u>x</u>	<u>y</u>	<u>y'</u>	<u>M₁ = 98</u>
2018				
1	1	8	8	M ₂ = 69
2	2	7	7	M ₃ = 103 okun.
3	3	11	11	
2019				
1	4	9	10.8	
2	5	10		
3	6	12		

winters yöntemi uygulanır. $\alpha = 0.1$ $\beta = 0.2$ $\gamma = 0.3$

$$y'_t = \alpha \frac{y_t}{I_{t-L}} + (1-\alpha) (y'_{t-1} + b_{t-1}) \quad \text{okun.}$$

L=3 okun.

$$b_t = \gamma (y'_t - y'_{t-1}) + (1-\gamma) b_{t-1}$$

$$I_t = \beta \frac{y_t}{y'_t} + (1-\beta) I_{t-L}$$

L=3 olduğunda

$$y'_4 = \alpha \frac{y_4}{I_1} + (1-\alpha) (y'_3 + b_3) \quad \begin{matrix} t-L=1 \\ t=4 \text{ okun.} \end{matrix}$$

önce

$$b_2 = \gamma (y'_2 - y'_1) + (1-\gamma) b_1$$

$b_1 = 0$ alalım

$$b_2 = 0.3 (7 - 8) + 0.7 \cdot 0$$

$$b_2 = -0.3$$

$$b_3 = 0.3 (y'_3 - y'_2) + 0.7 \cdot b_2$$

$$b_3 = 0.3 (11 - 7) + 0.7 \cdot (-0.3) = 0.99$$

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$$y'_4 = 0.1 \frac{y_4}{I_1} + 0.9 (y'_3 + b_3)$$

$$y'_4 = 0.1 \frac{9}{98} + 0.9 (11 + 0.99) = 10.8$$

$$y'_5 = \alpha \frac{y_5}{I_2} + (1-\alpha) (y'_4 + b_4)$$

$$b_4 = \delta (y'_4 - y'_3) + (1-\delta) b_3$$

$$b_4 = 0.3 (10.8 - 11) + 0.7 \cdot 0.99 = 0.633$$

$$y'_5 = 0.1 \frac{10}{69} + 0.9 \underbrace{(10.8 + 0.633)}_{10.2897}$$

$$y'_5 = 10.304$$

$$b_5 = 0.3 (y'_5 - y'_4) + 0.7 b_4$$

$$b_5 = 0.3 (10.304 - 10.8) + 0.7 \cdot 0.633 = 0.2943$$

$$y'_6 = 0.1 \frac{y_6}{I_3} + 0.9 (b_5 + y'_5)$$

$$y'_6 = 0.1 \frac{12}{103} + 0.9 \underbrace{(0.2943 + 10.304)}_{9.538}$$

$$y'_6 = 9.550$$

y_7' 'yi Seri yansı yata bilinen yöntemlerden biriyke hesaplıyalım.

3

$$\begin{matrix} 2 & \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} & \begin{pmatrix} 8 \\ 7 \\ 11 \end{pmatrix} & \frac{26}{3} \\ 5 & \begin{pmatrix} 4 \\ 5 \\ 6 \end{pmatrix} & \begin{pmatrix} 9 \\ 10 \\ 12 \end{pmatrix} & \frac{31}{3} \end{matrix}$$

$$\left(2 \quad \frac{26}{3}\right) \left(5, \frac{31}{3}\right)$$

$$M = \frac{\frac{31}{3} - \frac{26}{3}}{5-2} = \frac{\frac{5}{3}}{3} = \frac{5}{9}$$

$$y - \frac{26}{3} = \frac{5}{9} (x-2)$$

$$y = \frac{5}{9}x - \frac{10}{9} + \frac{26}{3}$$

$$y = \frac{5}{9}x + \frac{68}{9}$$

$$x=7 \text{ yazılırsa}$$

$$y_7 = \frac{35}{9} + \frac{68}{9} = \frac{103}{9}$$

$$y_7 = 11.44$$

$$I_4 = 0.2 \frac{y_4}{y'_4} + 0.8 I_1$$

$$= 0.166 + 0.8 \cdot 98$$

7-L
4 3

$$I_4 = 0.2 \frac{9}{10.8} + 0.8 \cdot 98$$

$$I_4 = 78.566$$

$$y'_7 = 0.1 \frac{y_7}{I_4} + 0.9 (y'_6 + b_6)$$

$$b_6 = 0.3 (y'_6 - y'_5) + 0.7 (b_5)$$

$$b_6 = 0.3 (9.55 - 10.304) + 0.7 \cdot 0.2943$$

$$= -0.02$$

$$y'_7 = 0.1 \frac{11.44}{78.566} + 0.9 (9.55 - 0.02)$$

$$= 0.01456 \quad \underbrace{\hspace{1cm}}_{8.577}$$

$$= 8.591$$

4.

Aynı örneği Holt denklemine uygulayalım.

$$y'_t = \alpha y_t + (1-\alpha)(y'_{t-1} + b_{t-1})$$

$$b_t = \delta (y'_t - y'_{t-1}) + (1-\delta)b_{t-1}$$

$$\hat{y}_{t+M} = y'_t + b_t \cdot M$$

$\alpha = 0.1$ $\delta = 0.2$ olsun.

t	y	y'
1	8	8
2	7	7.9
3	11	
4	9	
5	10	
6	12	

$$t-1=1 \quad t=2$$

$$y'_2 = 0.1 y_2 + 0.9 (y'_1 + b_1)$$

$$y'_2 = 0.1 \cdot 7 + 0.9 (8 + \cancel{b_1})$$

$$y'_2 = 0.7 + 7.2 = 7.9$$

$$b_2 = \delta (y'_2 - y'_1) + (1-\delta) \cancel{b_1}$$

$$b_2 = 0.2 (7.9 - 8) = -0.02$$

$$y'_3 = 0.1 (y_3) + 0.9 (y'_2 + b_2)$$

$$= 0.1 \cdot 11 + 0.9 (7.9 - 0.02)$$

$$= 1.1 + 7.082$$

$$= 8.192$$

$$b_3 = \delta (y'_3 - y'_2) + (1-\delta) b_2$$

$$b_3 = 0.2 (8.192 - 7.9) + 0.8 (-0.02)$$

$$b_3 = 0.0584 - 0.016$$

$$= 0.0424$$

5

$$y_4' = \alpha y_4 + (1-\alpha)(y_3' + b_3)$$

$$y_4' = 0.1 \cdot 9 + (0.9)(8.192 + 0.0424)$$

$$y_4' = 0.9 + 7.41 \\ = 8.31$$

$$b_4 = 0.2(y_4' - y_3') + 0.8b_3$$

$$b_4 = 0.2(8.31 - 8.192) + 0.8 \cdot 0.0424$$

$$b_4 = 0.0236 + 0.8 \times 0.0424 \\ = 0.0263$$

$$y_5' = 0.1 y_5 + 0.9(y_4' + b_4)$$

$$y_5' = 0.1 \cdot 10 + 0.9(8.31 + 0.0263) \\ = 1 + 7.5$$

$$y_5' = 8.5$$

$$b_5 = 0.2(y_5' - y_4') + 0.8b_4$$

$$b_5 = 0.2(8.5 - 8.31) + 0.8 \cdot 0.0263 \\ = 0.038 + 0.8 \cdot 0.0263 \\ = 0.059$$

$$y_6' = 0.1 y_6 + 0.9(y_5' + b_5)$$

$$y_6' = 0.1 \cdot 12 + 0.9(8.5 + 0.059)$$

$$y_6' = 1.2 + 7.70$$

$$y_6' = 8.9$$

[6]

$$b_6 = 0.2(y'_6 - y'_5) + 0.8 b_5$$

$$b_6 = 0.2(8.9 - 8.5) + 0.8(0.059)$$

$$b_6 = 0.2 \cdot 0.4 + 0.8 \cdot 0.059$$

$$b_6 = 0.1272$$

$$y'_7 = \alpha y_7 + (1-\alpha)(y'_{t-1} + b_{t-1})$$

y_7 'yi seri yarısı yada $y = ax + b$ den hesaplayalım (5) Sayıfada $y_7 = 11.44$ bulunur

$$y'_7 = 0.1 \cdot 11.44 + 0.8 (y'_6 + b_6)$$

$$= 0.1 \cdot 11.44 + 0.8 (8.9 + 0.1272)$$

$$= 1.44 + 7.221$$

$$= 8.661$$