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$$T_k = \beta(L_k - L_{k-1}) + (1 - \beta)T_{k-1}, \quad (2.2)$$

$$y_{k+p}^* = L_k - pT_k, \quad p = 1, 2, \dots \quad (2.3)$$

$$\begin{aligned}
 & L_k - \dots; \\
 & T_k - \dots; \\
 & \alpha, \beta, - \dots, \\
 & , 0 \leq \alpha \leq 1, 0 \leq \beta \leq 1. \\
 & , \dots, \dots, \\
 & \cdot \\
 & , \quad \alpha = \beta, \dots, \\
 & , \dots, \dots. \\
 & , \quad L_{k-1}, T_{k-1}. \\
 & L_{k-1} \\
 & \cdot, \quad T_{k-1}, \\
 & y = f(t) \left(\dots \right). \\
 & y_1, y_2, \dots, y_{k-1}. \\
 & T_{k-1} = \Delta f, \quad (2.4)
 \end{aligned}$$

$\Delta f -$

-

$$k = 2, 3 \quad L_{k-1} = y_{k-1}, T_{k-1} = 0.$$

$$L_k = \alpha \frac{y_k}{S_{k-s}} + (1 - \alpha)(L_{k-1} + T_{k-1}), \quad (2.5)$$

$$T_k = \beta(L_k - L_{k-1}) + (1 - \beta)T_{k-1}, \quad (2.6)$$

$$L_k = \gamma \frac{y_k}{L_k} + (1 - \gamma)S_{k-s}, \quad (2.7)$$

p

$$y_{k+p}^* = (L_k - pT_k)S_{k-s+p}. \quad (2.8)$$

$L_k -$

;

$T_k -$

;

$S_k -$;
 $s -$,
 ;
 $\alpha, \beta, \gamma -$,
 $0 \leq \alpha \leq 1, 0 \leq \beta \leq 1, 0 \leq \gamma \leq 1.$

,
 ,
 ,
 $L_{k-1}, T_{k-1}, S_{k-s+p} \cdot L_{k-1}$
 T_{k-1} .
 $S_l, l = 1, \dots, s,$

$$S_l = \frac{y_l}{L_s}, \quad (2.9)$$

$L_s -$,
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2.2

: $\alpha = 0,3$; $\beta = 0,3$; $\gamma = 0,7$.

2.1 –

01	02	03	04	05	06
2,580	2,822	3,080	2,827	2,704	2,971
07	08	09	10	11	12
3,219	2,977	2,837	3,121	3,347	3,116

1

$s = 4$.

: $L_4, T_4, S_1, S_2, S_3, S_4$.

L_4 –

$$L_4 = \frac{2,58 + 2,822 + 3,08 + 2,827}{4} = 2,827.$$

$$y = a_0 + a_1 t$$

$$\begin{cases} 4 \cdot a_0 + 10 \cdot a_1 = 11,309, \\ 10 \cdot a_0 + 30 \cdot a_1 = 28,772. \end{cases}$$

$$a_1 = 0,0999, a_0 = 2,5775,$$

$$y = 2,5775 + 0,0999t, \quad (3.10)$$

$$: y_1 = 2,677, y_2 = 2,777 .$$

$$T_4 = 0,1 .$$

—

$$S_1 = \frac{y_1}{L_4} = \frac{2,58}{2,827} = 0,913 ;$$

—

$$S_2 = \frac{y_2}{L_4} = \frac{2,822}{2,827} = 0,998 ;$$

—

$$S_3 = \frac{y_3}{L_4} = \frac{3,08}{2,827} = 1,089 ;$$

—

$$S_4 = \frac{y_4}{L_4} = \frac{2,827}{2,827} = 1$$

$$L_5 = \alpha \frac{y_4}{S_1} + (1 - \alpha)(L_4 + T_4) =$$

$$= 0,3 \frac{2,827}{0,913} + (1 - 0,3)(2,827 + 0,1) = 2,978$$

$$T_5 = \beta (L_5 - L_4) + (1 - \beta)T_4 =$$

$$= 0,3(2,978 - 2,827) + (1 - 0,3) \cdot 0,1 = 0,115$$

$$S_5 = \gamma \frac{y_4}{L_5} + (1 - \gamma)S_1 =$$

;

$$= 0,7 \cdot \frac{2,827}{2,978} + (1 - 0,7) \cdot 0,913 = 0,938$$

$$y_5^* = (L_5 + T_5)S_1 =$$

;

$$= (2,978 + 0,115) \cdot 0,913 = 2,823$$

$$\varepsilon_5 = y_5 - y_5^* =$$

$$= 2,704 - 2,823 = -0,119.$$

$$L_6 = \alpha \frac{y_5}{S_2} + (1 - \alpha)(L_5 + T_5) =$$

$$= 0,3 \frac{2,704}{0,998} + (1 - 0,3)(2,978 + 0,115) = 2,978$$

$$S_7 = \gamma \frac{y_6}{L_7} + (1 - \gamma)S_3 =$$

$$= 0,7 \cdot \frac{2,971}{2,959} + (1 - 0,7) \cdot 1,089 = 1,03$$

$$y_7^* = (L_7 + T_7)S_3 =$$

$$= (2,959 + 0,051) \cdot 1,089 = 3,279$$

$$\varepsilon_7 = y_7 - y_7^* =$$

$$= 3,219 - 3,279 = -0,06.$$

$$L_8 = \alpha \frac{y_7}{S_4} + (1 - \alpha)(L_7 + T_7) =$$

$$= 0,3 \frac{3,219}{1} + (1 - 0,3)(2,959 + 0,051) = 3,073$$

$$T_8 = \beta(L_8 - L_7) + (1 - \beta)T_7 =$$

$$= 0,3(3,073 - 2,959) + (1 - 0,3) \cdot 0,051 = 0,07$$

$$S_8 = \gamma \frac{y_7}{L_8} + (1 - \gamma)S_4 =$$

$$= 0,7 \cdot \frac{3,219}{3,073} + (1 - 0,7) \cdot 1 = 1,033$$

$$y_8^* = (L_8 + T_8)S_4 =$$

$$= (3,073 + 0,07) \cdot 1 = 3,142$$

$$\varepsilon_8 = y_8 - y_8^* =$$

$$= 2,977 - 3,142 = -0,165.$$

$$L_9 = \alpha \frac{y_8}{S_5} + (1 - \alpha)(L_8 + T_8) =$$

$$= 0,3 \frac{2,977}{0,938} + (1 - 0,3)(3,073 + 0,07) = 3,152$$

$$T_9 = \beta(L_9 - L_8) + (1 - \beta)T_8 =$$

$$= 0,3(3,152 - 3,073) + (1 - 0,3) \cdot 0,07 = 0,072$$

$$S_9 = \gamma \frac{y_8}{L_9} + (1 - \gamma)S_5 =$$

$$= 0,7 \cdot \frac{2,977}{3,152} + (1 - 0,7) \cdot 0,938 = 0,943$$

$$y_9^* = (L_9 + T_9)S_5 =$$

$$= (3,152 + 0,072) \cdot 0,938 = 3,025$$

$$\varepsilon_9 = y_9 - y_9^* =$$

$$= 2,837 - 3,025 = -0,188.$$

$$L_{10} = \alpha \frac{y_9}{S_6} + (1 - \alpha)(L_9 + T_9) =$$

$$= 0,3 \frac{2,837}{0,935} + (1 - 0,3)(3,152 + 0,072) = 3,167$$

$$T_{10} = \beta(L_{10} - L_9) + (1 - \beta)T_9 =$$

$$= 0,3(3,167 - 3,152) + (1 - 0,3) \cdot 0,072 = 0,055$$

$$S_{10} = \gamma \frac{y_9}{L_{10}} + (1 - \gamma)S_6 =$$

;

$$= 0,7 \cdot \frac{2,837}{3,167} + (1 - 0,7) \cdot 0,935 = 0,908$$

$$y_{10}^* = (L_{10} + T_{10})S_6 =$$

;

$$= (3,167 + 0,055) \cdot 0,935 = 3,013$$

$$\varepsilon_{10} = y_{10} - y_{10}^* =$$

$$= 3,121 - 3,013 = 0,108.$$

$$L_{11} = \alpha \frac{y_{10}}{S_7} + (1 - \alpha)(L_{10} + T_{10}) =$$

$$= 0,3 \frac{3,121}{1,03} + (1 - 0,3)(3,167 + 0,055) = 3,165$$

$$\begin{aligned}
 T_{11} &= \beta(L_{11} - L_{10}) + (1 - \beta)T_{10} = \\
 &= 0,3(3,165 - 3,167) + (1 - 0,3) \cdot 0,055 = 0,038
 \end{aligned}$$

$$\begin{aligned}
 S_{11} &= \gamma \frac{y_{10}}{L_{11}} + (1 - \gamma)S_7 = \\
 &= 0,7 \cdot \frac{3,121}{3,165} + (1 - 0,7) \cdot 1,03 = 0,999
 \end{aligned}$$

$$\begin{aligned}
 y_{11}^* &= (L_{11} + T_{11})S_7 = \\
 &= (3,165 + 0,038) \cdot 1,03 = 3,298
 \end{aligned}$$

$$\begin{aligned}
 \varepsilon_{11} &= y_{11} - y_{11}^* = \\
 &= 3,347 - 3,298 = 0,049.
 \end{aligned}$$

$$\begin{aligned}
 L_{12} &= \alpha \frac{y_{11}}{S_8} + (1 - \alpha)(L_{11} + T_{11}) = \\
 &= 0,3 \frac{3,347}{1,033} + (1 - 0,3)(3,165 + 0,038) = 3,214
 \end{aligned}$$

$$\begin{aligned}
 T_{12} &= \beta(L_{12} - L_{11}) + (1 - \beta)T_{11} = \\
 &= 0,3(3,214 - 3,165) + (1 - 0,3) \cdot 0,038 = 0,041
 \end{aligned}$$

$$S_{12} = \gamma \frac{y_{11}}{L_{12}} + (1 - \gamma) S_8 =$$

;

$$= 0,7 \cdot \frac{3,343}{3,214} + (1 - 0,7) \cdot 1,033 = 1,039$$

$$y_{12}^* = (L_{12} + T_{12}) S_8 =$$

;

$$= (3,214 + 0,041) \cdot 1,033 = 3,364$$

$$\varepsilon_{12} = y_{12} - y_{12}^* =$$

$$= 3,116 - 3,364 = -0,248.$$

2.2

2.2 –

k	5	6	7	8	9	10	11	12
L_k	2,978	2,978	2,959	3,073	3,152	3,167	3,165	3,214
T_k	0,115	0,081	0,051	0,07	0,072	0,055	0,038	0,041
S_k	0,938	0,935	1,03	1,033	0,943	0,908	0,999	1,039
y_k^*	2,823	3,053	3,279	3,142	3,025	3,013	3,298	3,364
ε_k	-0,119	-0,082	-0,06	-0,165	-0,188	0,108	0,049	-0,248

2.3

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$$\varepsilon_y = \sqrt{\frac{1}{12 - s - 2} \sum_{i=s+2}^{12} \varepsilon_i^2},$$

$$\varepsilon_y = \sqrt{\frac{0,248^2 + 0,041^2 + 0,108^2 + 0,188^2 + 0,165^2 + 0,06^2 + 0,082^2}{6}} = 0,157.$$

:

$$\begin{aligned} y_{13}^* &= (L_{12} + T_{12})S_9 = \\ &= (3,214 + 0,041) \cdot 0,943 = 3,069 \end{aligned}$$

$$\begin{aligned} y_{14}^* &= (L_{12} + 2 \cdot T_{12})S_{10} = \\ &= (3,214 + 2 \cdot 0,041) \cdot 0,908 = 2,992 \end{aligned}$$

$$y_{15}^* = (L_{12} + 3 \cdot T_{12})S_{11} =$$

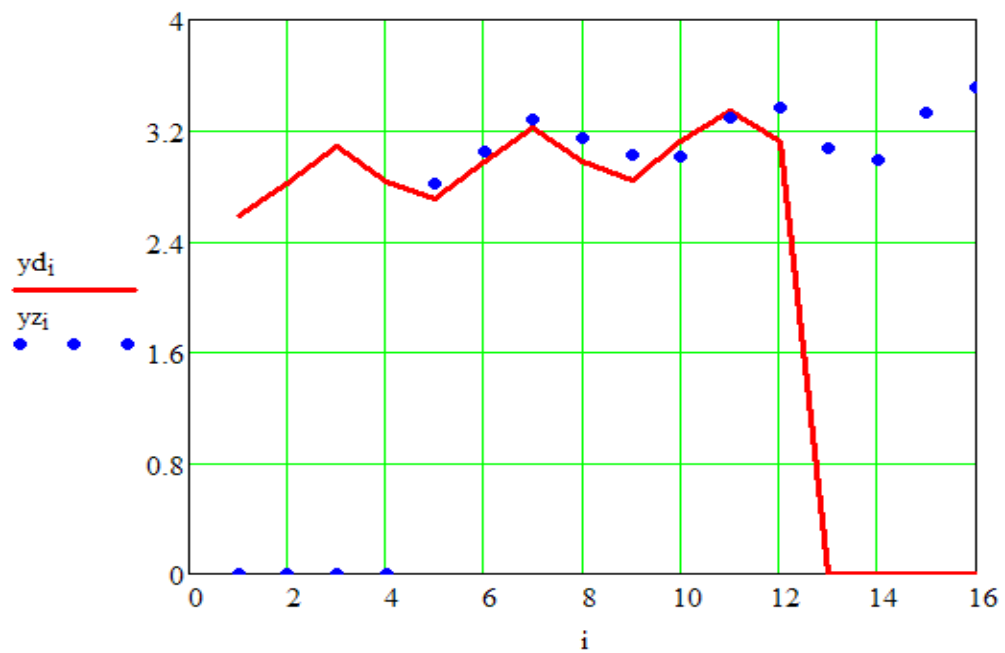
$$= (3,214 + 3 \cdot 0,041) \cdot 0,999 = 3,335$$

$$y_{16}^* = (L_{12} + 4 \cdot T_{12})S_{12} =$$

$$= (3,214 + 4 \cdot 0,041) \cdot 1,039 = 3,511$$

2.3 –

y_{13}^*	y_{14}^*	y_{15}^*	y_{16}^*
3,069	2,992	3,335	3,511



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2,580	2,822	3,080	2,827	2,704	2,971
07	08	09	10	11	12
3,219	2,977	2,837	3,121	3,347	3,116

$$: \alpha = 0,3; \beta = 0,3; \gamma = 0,7.$$

$$L_4 = 2,827 \quad . .$$

:

 $L_k -$

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 $T_k -$

;

$S_k -$;

$y_k^* -$;

$\varepsilon_k -$.

k	5	6	7	8	9	10	11	12
L_k	2,978	2,978	2,959	3,073	3,152	3,167	3,165	3,214
T_k	0,115	0,081	0,051	0,07	0,072	0,055	0,038	0,041
S_k	0,938	0,935	1,03	1,033	0,943	0,908	0,999	1,039
y_k^*	2,823	3,053	3,279	3,142	3,025	3,013	3,298	3,364
ε_k	-0,119	-0,082	-0,06	-0,165	-0,188	0,108	0,049	-0,248

:

y_{13}^*	y_{14}^*	y_{15}^*	y_{16}^*
3,069	2,992	3,335	3,511

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