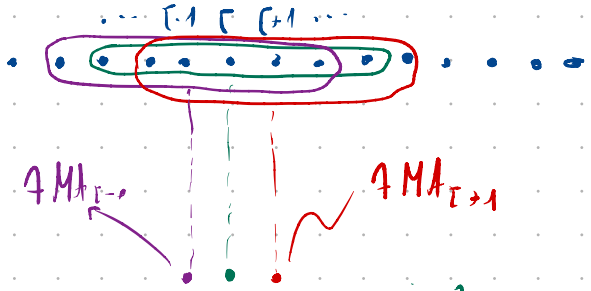
3x7 MA

Solution



$$7\text{-MA}_t = \frac{1}{7}\sum_{i=-3}^{i=+3} y_{t+i} = \frac{1}{7}\left[y_{t-3} + y_{t-2} + y_{t-1} + y_t + y_{t+1} + y_{t+2} + y_{t+3}\right]$$

$$3\text{x}7\cdot\text{MA}_t = \frac{1}{3}\left[7\text{-MA}_{t-1} + 7\text{-MA}_t + 7\text{-MA}_{t+1}\right] =$$

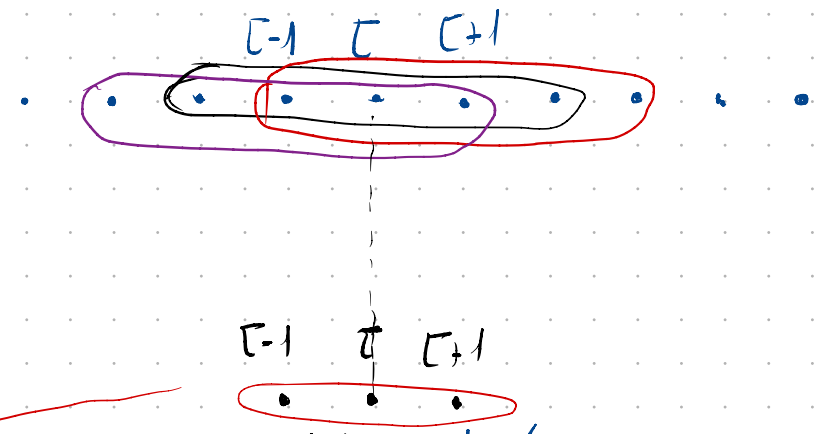
$$= \frac{1}{3}\cdot\frac{1}{7}\left[y_{t-4} + 2y_{t-3} + 3\left[y_{t-2} + y_{t-1} + y_t + y_{t+1} + y_{t+2}\right] + 2y_{t+3} + y_{t+4}\right] =$$

Coefficients add up to $3\cdot 7 = 21 = 1+2+3\cdot 5+2+1$ ✓

$$= \sum_{i=-4}^{i=4} a_j y_{t+j} \quad \text{with} \quad a_j = \left[\frac{1}{21}, \frac{2}{21}, \frac{3}{21}, \frac{3}{21}, \frac{3}{21}, \frac{3}{21}, \frac{3}{21}, \frac{2}{21}, \frac{1}{21}\right]$$

j: -4 -3 -2 -1 0 1 2 3 4

3×5 MA



$$5\text{-}MA_t = \frac{1}{5}\left(y_{t-2} + y_{t-1} + y_t + y_{t+1} + y_{t+2}\right)$$

$$3\times 5MA_t = \frac{1}{3}\left[5MA_{t-1} + 5MA_t + 5MA_{t+1}\right] =$$

$$= \frac{1}{15}\left[y_{t-3} + 2y_{t-2} + 3y_{t-1} + 3y_t + 3y_{t+1} + 2y_{t+2} + y_{t+3}\right]$$

$$\left[\sum_{j=-3}^{j=3} a_j y_{t+j}\right], \quad \left[a_j = \left[\frac{1}{15}, \frac{2}{15}, \frac{3}{15}, \frac{3}{15}, \frac{3}{15}, \frac{2}{15}, \frac{1}{15}\right]\right]$$

$$j = -3, -2, -1, 0, 1, 2, 3$$