

Model:

$$y(t) = a_1 y(t-1) + \dots + a_n y(t-n) + b_1 u_1(t-1) + \dots + b_m u_1(t-m) + c_1 u_2(t-1) + \dots + c_k u_2(t-k) + D$$

Matrix A of measure:

$$\begin{bmatrix} y(t-1) & \dots & y(t-n) & u_1(t-1) & \dots & u_1(t-m) & u_2(t-1) & \dots & u_2(t-k) & 1 \\ \vdots & & & & & & & & & \vdots \\ y(M+1-1) & \dots & y(M+1-n) & u_1(M+1-1) & \dots & u_1(M+1-m) & u_2(M+1-1) & \dots & u_2(M+1-k) & 1 \end{bmatrix}$$

Vector of param of the model X:

$$X = \begin{bmatrix} a_1 \\ \vdots \\ a_n \\ b_1 \\ \vdots \\ b_m \\ c_1 \\ \vdots \\ c_k \\ D \end{bmatrix}$$

Vector of the output (measure):

$$Y = \begin{bmatrix} y(t) \\ \vdots \\ y(M+1) \end{bmatrix}$$

legend:

$$M = \max(n, m, k)$$

Dimension:

$$A = (t-m) * (n+m+k+1)$$

$$X = (n+m+k+1) * 1$$

$$Y = (t-m) * 1$$