$$\begin{split} & \left[ x_{k} \, y_{k} \, z_{k} \, x_{k}^{*} \, y_{k}^{*} \, z_{k}^{*} \, x_{k}^{**} \, y_{k}^{**} \, z_{k}^{**} \, \theta_{xk} \, \theta_{yk} \, \theta_{zk} \, \theta_{yk}^{*} \, \theta_{zk}^{*} \, \theta_{yk}^{*} \, \theta_{zk}^{*} \right] \\ & x_{k}^{*} = x_{k-1}^{*} + x_{k-1}^{*} T_{s} + \frac{1}{2} x_{k-1}^{**} T_{s}^{2} \\ & x_{k}^{*} = x_{k-1}^{*} + x_{k-1}^{**} T_{s} \\ & x_{k}^{**} = x_{k-1}^{**} \end{split}$$

$$y = y_{k-1} + y_{k-1}^* T_s + \frac{1}{2} y_{k-1}^{**} T_s^2$$

$$y_k^* = y_{k-1}^* + y_{k-1}^{**} T_s$$

$$y_k^{**} = y_{k-1}^{**}$$

$$\begin{split} z_k &= z_{k-1} + z_{k-1}^* T_s + \frac{1}{2} z_{k-1}^{**} T_s^2 \\ z_k^* &= z_{k-1}^* + z_{k-1}^{**} T_s \\ z_k^{**} &= z_{k-1}^* \end{split}$$

$$\theta_{xk} = \theta_{xk-1} + \theta_{xk-1}^* T_s$$

$$\theta_{xk}^* = \theta_{xk-1}^*$$

$$\theta_{yk} = \theta_{yk-1} + \theta_{yk-1}^* T_s$$
  
$$\theta_{yk}^* = \theta_{yk-1}^*$$

$$\theta_{zk} = \theta_{zk-1} + \theta_{zk-1}^* T_s$$

$$\theta_{zk}^* = \theta_{zk-1}^*$$

-	×	
-1	У	
	Z	
	x*	
+	у*	
	z*	1
- 1	x**	1
	y**	
- 1	Z**	
1	θх	
-	θу	
	θz	
	θх*	
1	θу*	
1	θz*	

0	0	0	0	0	0	0	0	Ts^2/2	0	0	Ts	0	0	1
0	0	0	0	0	0	0	Ts^2/2	0	0	Ts	0	0	1	0
0	0	0	0	0	0	Ts^2/2	0	0	Ts	0	0	1	0	0
0	0	0	0	0	0	0	0	Ts	0	0	1	0	0	0
0	0	0	0	0	0	0	Ts	0	0	1	0	0	0	0
0	0	0	0	0	0	Ts	0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
0	0	Ts	0	0	1	0	0	0	0	0	0	0	0	0
0	Ts	0	0	1	0	0	0	0	0	0	0	0	0	0
Ts	0	0	1	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0