

* Matrix Keteramatan [Q]
Observability Matrix

$$y = Cx + Du$$

$\downarrow$ $\downarrow$
 $[k \times n]$ $[k \times m]$

$$[Q] = \begin{bmatrix} C^T & A^T C^T & (A^T)^2 C^T & \dots & (A^T)^{n-1} C^T \end{bmatrix}$$

$[n \times k]$ $[n \times k]$ $[n \times k]$ $[n \times k]$
 $[n \times kn]$

Jika $k > 1$ (multi output) $\rightarrow [Q]$ bukan matrix bujursangkar, kendalian sepenuhnya teramat (completely observable) jika $[Q]$ "full rank" atau $\text{rank}(Q) = n$

Jika $k = 1$ (single output) $\rightarrow [Q] [n \times n]$, kendalian sepenuhnya teramat (completely observable) jika $\det(Q) \neq 0$, $[Q]$ non singular, $[Q]^{-1}$ ada.