Mechatronic System Simulation - Solution of DAE related problems [1]

1 REGULAR PENCIL

Definition: given B,C $\in R^{nxn}$, the couple (B, C) is a regular pencil if $f(\lambda) =$ det(B-λ C) is not identically 0, or equivalently there exists λ such that $f(\lambda) \neq 0$.

Example:

$$B = \begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix} C = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$$

$$det(B - \lambda C) = det\left(\begin{bmatrix} 1-\lambda & 1 \\ 0 & 0 \end{bmatrix}\right) = 0 \Rightarrow \text{The pencil (B, C) is not regular}$$

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