

# Assignment 2

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## Problem 1.

$$R = \begin{bmatrix} 2 & 1 & 0.75 & 0.5 & 0.25 \\ 1 & 2 & 1 & 0.75 & 0.5 \\ 0.75 & 1 & 2 & 1 & 0.75 \\ 0.5 & 0.75 & 1 & 2 & 1 \\ 0.25 & 0.5 & 0.75 & 1 & 2 \end{bmatrix}$$

Filter Order	Eigenvalue Spread	Corresponding Upper Bound, $\mu$
2	3.0	0.5
3	4.2088	0.333
4	5.0396	0.25
5	5.6864	0.2

Table 1: Power Supply Technical Specifications

You could not use a value close to the upperbound of the second order filter for the fifth order because it exceeds the upper bound therefore the filter would diverge.

## Problem 2.

$$P = \begin{bmatrix} 0.5 \\ 0.25 \\ 0.125 \\ 0.0625 \\ 0.03125 \end{bmatrix}$$

The tap-input vectors for their corresponding filter orders are calculated below

$$W_{02} = \begin{bmatrix} 0.25 \\ 0 \end{bmatrix} W_{03} = \begin{bmatrix} 0.2571 \\ 0.0179 \\ -0.0420 \end{bmatrix} W_{04} = \begin{bmatrix} 0.2575 \\ 0.0219 \\ -0.0325 \\ -0.0251 \end{bmatrix} W_{05} = \begin{bmatrix} 0.2577 \\ 0.0217 \\ -0.0331 \\ -0.0266 \\ 0.0037 \end{bmatrix}$$