# Assignment 3: Stability Analysis

We know that the canonic form of the poles of a second order transfer function in function of natural frequency $\omega_n$ and damping coefficient $\zeta$ can be written as below:

$$s_{1,2} = -\zeta\omega_n \pm \omega_n\sqrt{\zeta^2 - 1}$$

For the following values of damping coefficient $\zeta$, draft the position of poles in s-plane and draft the time response. Categorize the stability of the system for each case.

1. $\zeta = 0$
2. $0 < \zeta < 1$
3. $\zeta = 1$
4. $\zeta > 1$

10 Marks

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