# Lab 2: Transient Response of Second-Order Systems

Objective:

• Understand the effect of natural frequency (ωn) and damping ratio (ζ) on transient response.

Tasks:

1. Simulate a second-order system with different ζ and ωn.  
2. Plot and compare multiple step responses on a single plot.  
3. Analyze overshoot, rise time, and settling time.  
4. Design a system that meets a specified overshoot requirement.

Deliverables:

• MATLAB plots with proper labels.  
• Comparison analysis and discussion.  
• Final design parameters with justification.  
• Well-formatted report.