Prelab 2: Digital Simulation

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1 All-Integrator Block Diagram

$H_1(s) = \frac{Y(s)}{U(s)} = \frac{25}{s^2+6s+25}$

This can be rearranged to give the equation $s^2Y(s) = 25U(s) - 6sY(s) - 25Y(s)$, which produces the following all-integrator block diagram:

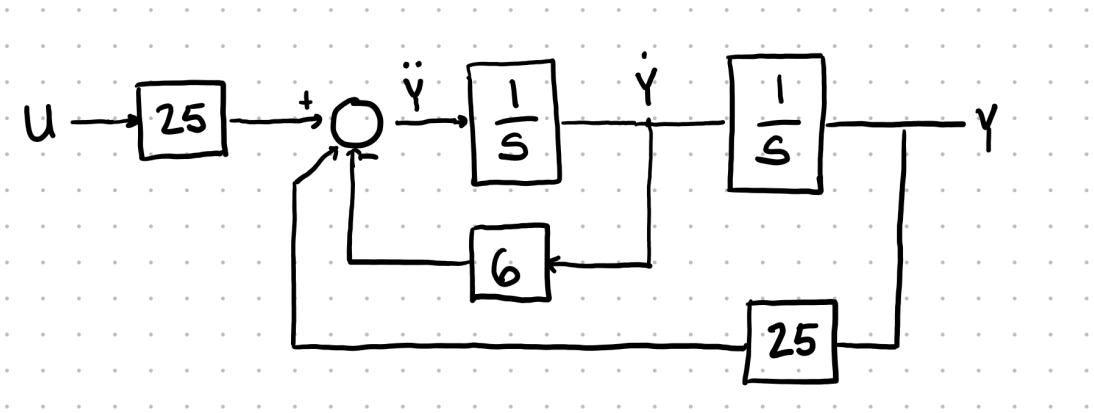

Figure 1: All-integrator Block Diagram for $H_1(s)$

This system has $\omega_n = \sqrt{25} = 5$ and $\zeta = \frac{6}{2\omega_n} = \frac{6}{10} = 0.6$, indicating the system is underdamped. Its poles are at the zeros of $s^2 + 6s + 25$, which are $-3 + j4$ and $-3 - j4$.