Problem 10

A mass weighing 16 lb stretches a spring 3 in. The mass is attached to a viscous damper with a damping constant of 2 lb·s/ft. If the mass is set in motion from its equilibrium position with a downward velocity of 3 in/s, find its position \( u \) at any time \( t \). Plot \( u \) versus \( t \). Determine when the mass first returns to its equilibrium position. Also find the time \( \tau \) such that \( |u(t)| < 0.01 \) in for all \( t > \tau \).