

Problem 15

Consider the initial value problem

$$4y'' + 12y' + 9y = 0, \quad y(0) = 1, \quad y'(0) = -4.$$

- (a) Solve the initial value problem and plot its solution for $0 \leq t \leq 5$.
- (b) Determine where the solution has the value zero.
- (c) Determine the coordinates (t_0, y_0) of the minimum point.
- (d) Change the second initial condition to $y'(0) = b$ and find the solution as a function of b . Then find the critical value of b that separates solutions that always remain positive from those that eventually become negative.