

Problem 31

Consider the initial value problem

$$y' - \frac{3}{2}y = 3t + 2e^t, \quad y(0) = y_0.$$

Find the value of y_0 that separates solutions that grow positively as $t \rightarrow \infty$ from those that grow negatively. How does the solution that corresponds to this critical value of y_0 behave as $t \rightarrow \infty$?