M 327J - Differential Equations with Linear Algebra
September 19, 2022

Quiz 3

1. [**5 points**] Find the particular solution to the initial value problem

$$
\begin{cases}
\dfrac{d^2y}{dt^2} - 2t^2y = 0 \\
\qquad y(0) = 1 \\
\qquad y'(0) = 2
\end{cases}
$$

For your answer write the first four terms of the solution's series.

2. [**5 points**] Suppose a weight of mass 5 kg is attached to a spring with spring constant $k = 5$ N/m and damping constant $c = 10$ Ns/m. At $t = 0$ the mass is 0.1 m below its equilibrium position with velocity 0.2 m/s toward the equilibrium position. How many times will the mass return to its equilibrium position?
Hint: either never, once, or infinitely many times.