MA 527
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Fall 2017

Homework 5

Due October 12th in class or by 1:50 pm in MATH 602.

1. Let $a > 1$ and $M > 0$ be given, and consider the initial value problem

$$y''(t) + 4y(t) = M(u(t-1) - u(t-a)), \qquad y(0) = y'(0) = 0.$$

   (a) Find $y(t)$.

   (b) Find all possible values of M and a such that $y(t) \equiv 0$ for all $t > a$.

   (c) Sketch the graph of $y(t)$ for one of the choices of M and a you found in part (b).

2. Let $a > 1$ and $M > 0$ be given, and consider the initial value problem

$$y''(t) + 4y(t) = \delta(t-1) + M\delta(t-a), \qquad y(0) = y'(0) = 0.$$

   (a) Find $y(t)$.

   (b) Find all possible values of M and a such that $y(t) \equiv 0$ for all $t > a$.

   (c) Sketch the graph of $y(t)$ for one of the choices of M and a you found in part (b).