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/m333.sp07/handouts333/Driven2OLDECC_probs/ProbsDriven304

These problems concern *driven* second-order linear differential equations with constant coefficients.

The following problems are intended to be solved by algebra and the laws of logarithms. Decimal approximations are unacceptable for this assignment.

Algebra Warmups:

(a) $\ln(e^6) = 6$

(b) $e^{\ln(6)} = 6$

(c) Algebra: $\cosh(\ln(5)) = \frac{13}{5}$ and $\sinh(\ln(5)) = \frac{12}{5}$.

Solve the following initial-value problems. Show your steps and “display” salient intermediate results.

1 $y'' + 4y = -36 \sin(4t)$ with $y(\pi) = 1$ and $y'(\pi) = 0$.

2 $y'' + 4y = 16t^3 - 36 \sin(4t)$ with $y(0) = 2$ and $y'(0) = 14$.

3 $y'' - y = \text{Step}(t, \ln(2))$ with $y(0) = 0$ and $y'(0) = 1$.

4 $y'' + 4y' + 4y = e^{3t}$ with $y(1) = 2$ and $y'(1) = 0$.