Quiz 4, Math 246, Professor David Levermore
Tuesday, 1 October 2019

Your Name:

Discussion Instructor (circle one): Sam Potter Nathan Yu David Russell
Discussion Time (circle one): 9:00 11:00 12:00

No books, notes, calculators, or any electronic devices.
Show your reasoning for full credit. Good luck!

(1) [3] Determine the interval of definition for the solution to the initial-value problem

$$u''' + 7t\,u'' - \frac{1}{\sin(t)}\,u' - \frac{\sin(3t)}{5+t}\,u = \frac{e^t}{3-t}\,, \qquad u(-4) = u'(-4) = u''(-4) = 2\,.$$

(2) [3] Compute the Wronskian $\mathrm{Wr}[V_1, V_2](t)$ of the functions $V_1(t) = e^{2t}$ and $V_2(t) = t\,e^{2t}$. (Evaluate the determinant and simplify.)

(3) [4] Given that e^{2t} and $t\,e^{2t}$ are linearly independent solutions of $v'' - 4v' + 4v = 0$, solve the general initial-value problem associated with $t = 0$ — namely, solve

$$v'' - 4v' + 4v = 0\,, \qquad v(0) = v_0\,, \quad v'(0) = v_1\,.$$