

MATH 286 PROBLEMS DUE APRIL 4, 2001
(NOTE: TWO PAGES!!)

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1. Rewrite

$$x'' = \frac{(x')^2 + e^{t(y')}}{1 + t^2},$$

$$y''' = x^2 + e^{x'} - \sin((y')(y''))$$

as a system of first order differential equations.

2. Find the maximal interval of definition of the solution of

$$y' = \frac{1}{t}x + \frac{1}{\sin(t)}y + \cos(t),$$

$$x' = \frac{1}{\cos(t)}x + e^t y + \frac{1}{1 - t^2},$$

$$y\left(\frac{1}{2}\right) = 1,$$

$$x\left(\frac{1}{2}\right) = 0.$$

3. Calculate

$$\begin{pmatrix} 3 & 4 & 2 \\ 1+i & 1-i & 1+2i \\ 2-i & 1 & 1-i \end{pmatrix}^*.$$

4. Let $x = (1+i, 1-i, 2)$, $y = (1-2i, -1+i, 0)$. Calculate the inner product $\langle x, y \rangle$.

5. Find the inverse matrix of

$$A = \begin{pmatrix} 1 & 2 & -1 \\ 1 & 1 & 0 \\ 0 & 1 & 3 \end{pmatrix}.$$

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6. Solve:

$$\begin{array}{rcccccccl} x & + & 2y & + & z & + & t & = & 5 \\ & & y & & & - & t & = & 1 \\ x & & & + & 2z & + & 3t & = & 4. \end{array}$$