Math 3D

WINTER TERM 2004

## Midterm Examination

Print your name:

Print your ID #:

You have 50 minutes to solve the problems. Good luck!

**1.** Find the solution:

**A.** 
$$\dot{y} + 2ty = 2t \cos(t^2)$$
,  $y(0) = 0$ .  
**B.**  $\dot{y} + 2ty = 2t \sin(t^2)$ ,  $y(0) = 0$ .

2. Solve

**A.** 
$$\dot{y} = (\frac{t}{y})^2$$
,  $y(0) = 1$ .  
**B.**  $\dot{y} = e^{t-y}$ ,  $y(0) = 1$ .

**3.** Determine where the solution of

**A.** 
$$y'' + 2y' + y = 0$$
,  $y(0) = 0$ ,  $y'(0) = a > 0$   
**B.**  $y'' + 4y' + y = 0$ ,  $y(0) = a > 0$ ,  $y'(0) = a$ 

takes on its maximal value.

[The real number a is given and positive.]

4. Indicate which of the following equations are linear (l) and which are nonlinear (n) by circling your answer:

А.	$t^2y' = e^ty$	1	n
	$y' = t - \cos(y)$	1	n
	$y'' + 2y + y^2 = 0$	1	n
	$y'' + e^t y' + \ln(t)y = 0$	1	n
	$y'' + e^{y'} + y = 0$	1	n
в.	$e^t y' = t^2 y$	1	n
в.	$e^t y' = t^2 y$ $y' = \sin(t) - \cos(y)$	1 1	
в.	0 0	-	n
В.	$y' = \sin(t) - \cos(y)$	1	n n

5. Solve

**A.** 
$$y'' - y = 2$$
,  $y(0) = 0$ ,  $y'(0) = 0$ .  
**B.**  $y'' + y = 1$ ,  $y(0) = 0$ ,  $y'(0) = 0$ .