

MATHEMATICAL ANALYSIS 2

Test 2, version A.

1. Find the solution to the Cauchy problem

$$2xy' + y^2 = 1, \quad y(1) = 0.$$

Find the maximal interval where the solution is determined.

2. Find the general solution to equation

$$y' + y = xy^3.$$

3. Find the solution to the Cauchy problem

$$y^{(4)} + 2y'' + y = 0, \quad y(0) = 1, \quad y'(0) = 1, \quad y''(0) = -1, \quad y'''(0) = 1.$$

4. Find the general solution to the following system:

$$\begin{cases} \dot{x} = x + 2y \\ \dot{y} = x - 5 \sin t \end{cases}$$