

# MATHEMATICAL ANALYSIS 2

## Test 3, version C.

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1. Using the Laplace transform, solve the Cauchy problem

$$\begin{cases} x' = 2x + y \\ y' = -x + 2y \end{cases}, \quad x(0) = -1, \quad y(0) = 1.$$

2. Find the general solution to the difference equation

$$x_{n+3} = 4x_n - x_{n+2} - 2x_{n+1}, \quad n \geq 0.$$

3. Determine the Taylor series for the function  $f(x) = \frac{x+1}{(x-2)^3}$  at the point  $x = 3$ . Find the radius and the interval of convergence of the series.