

NUMERICAL ANALYSIS: 2018 GRADUATION TEST

Problem 1. Give the divided difference table for the following data points and give the Lagrange interpolating polynomial:

$$(1, -1), (2, 3), (3, 0), (4, 7), (5, 3).$$

Problem 2. Write down the trapezoidal rule and approximate the following integral, and give its error bound:

$$\int_0^{\pi/2} x \sin x \, dx.$$

Problem 3. Compute the following norms: $\|A\|_\infty$, $\|A\|_1$, $\|A\|_2$ for the matrix

$$A = \begin{pmatrix} 1 & 5 & 1 \\ -1 & 5 & 0 \\ 1 & 0 & 5 \end{pmatrix}.$$