

2013 SPRING, NUMERICAL ANALYSIS: GRADUATION TEST

**Problem 1.** Find the Lagrange interpolating polynomial for the data:  $x_i = i, f(x_i) = i + 1$  for  $i = 1, \dots, 5$ .

**Problem 2.** Determine  $c_1, c_2, x_1$ , and  $x_2$  so that the integration formula

$$\int_{-1}^1 f(x)dx \sim c_1f(x_1) + c_2f(x_2)$$

is exact up to the polynomial up to the degree  $n \leq 3$ .

**Problem 3.** Use the Householder's method to transform the following matrix in tridiagonal form:

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