Test 1 for ISA5305

Spring 2017

1. Generate a 4 by 4 matrix A with each element an integer in [0, 20], and a 4-dimendional integer column vector **b** randomly from [-10, 10], answer the following questions by using Matlab

(a) Solve **x** for A**x**=**b.**

(b) Calculate the determinant of A.

(c) Find the rank of A.

(d) Find $\|A\|_{p,}$ where p=1, 2, and ∞.

(e) Find the characteristic polynomial of A.

(f) Find the eigenvalues of A.

(g) Find the singular values of A.

(h) Find the eigenvalues of A^tA.

(i) Find a QR-factorization for A (that is, A=QR).

(j) Solve **y** for R**y**=Q^t**b.**

(k) Find $\|\mathbf{x}-\mathbf{y}\|_2$

2. Repeat Problem **1**.(a~k) for a 3 by 3 matrix B.

3. For dataX.txt, find the best-fitting line.

4. For dataY.txt, find the best-fitting parabola (a quadratic curve).

Note: dataX.txt and dataY.txt could be downloaded from my lecture website.