## PART 3 - Matrix operations - linear algebra, http://www.cs.rochester.edu/~stefanko/Teaching/08CS484

## 1 Theoretical part

3.1 (due Feb 19, 2008) CLRS 28.1-3, 28.1-4, 28.1-6, 28.1-7, 28.1-10, 28.2-5, 28.2-6, 28.3-4, 28.3-5.

## $\mathbf{2}$ Applied part (due Feb 19, 2008)

**3.2** (due Feb 19, 2008) For an  $n \times n$  matrix  $A = \{a_{ij}\}_{i,j=1}^{n}$ , let

$$|A|_{pq} = \left(\sum_{j=1}^{n} \left(\sum_{i=1}^{n} |a_{ij}|^p\right)^{q/p}\right)^{1/q}$$

Determine (experimentally, or theoretically) for which  $p, q \in \{1, 2, \infty\}$  is  $|\cdot|_{pq}$  a matrix norm?

**3.3** (due Feb 19, 2008) For an  $n \times n$  matrix  $A = \{a_{ij}\}_{i,j=1}^{n}$ , let

$$||A||_{pq} = \max\{||Ax||_q; ||x||_p \le 1\}$$

Determine (experimentally, or theoretically) for which  $p, q \in \{1, 2, \infty\}$  is  $\|\cdot\|_{pq}$  a matrix norm?