ECON 5350 Class Notes
Math Checklist

Below are topics that you need to understand in order to be successful in this class. They include topics from matrix algebra, probability and statistics. Please take some time to review these topics during the first few weeks of class.

1   Matrix Algebra

- Matrix multiplication

- Transpose rules for matrices

- Inner and outer products of a vector

- Idempotent matrices

- Matrix rank

- Orthogonality

- Matrix inversion

- Determinants

- Algebra of partitioned matrices

- Kronecker products

- Characteristic equations, roots and vectors

- Trace of a matrix

- Quadratic forms

- Matrix definiteness

- Matrix differentiation

2   Probability

2.1   Finite Samples

- Properties of probability density functions (pdfs)

- Properties of cumulative density functions (cdfs)

- Expectation operator

- Moment generating function and moments of a distribution

- Normal, chi-squared, F and t distributions

- Change of variable technique

- Joint and marginal distributions

- Covariances and correlations

- Independence

- Conditional distributions

- Distributions of quadratic forms

2.2 Large Samples

- Convergence in probability and mean square

- Convergence in distribution

- Consistency

- Slutsky's theorem

- Limiting distributions

- Central Limit Theorem

- Asymptotic distributions

3 Statistics

- Random sample

- Sample moments (i.e., mean, variance, skewness, kurtosis)

- Covariances and correlations

- Sampling distributions

- Unbiasedness

- Efficiency

- Mean-squared error

- Cramer-Rao lower bound

- Classical hypothesis testing

- Type I and II errors

- Size and power of a test

- Confidence intervals