Class Notes □ Q's

1. We've sketch the relation/connection among population and sample. Using the measurement models (e.g. measurements of the height of a door and the temperature of Yu-Fan-Tuan), we lead to the conception of Random Variable. To know what a random variable behave, we need probability distributions (d.f., pdf/pmf, mgf) and some quantities (parameters: expectation, variance, moments, etc).

2. Review: notions of Probability
   (a) *Random Variable*: Numerical variables associated with one population. (Continuous: Height, weight, blood pressure, Discrete: For/Against, Gender, Social-economic status)
   (b) *Probability*: A formal framework of analysis, studying uncertainty. probability mass function (for discrete r.v.); probability density function (pdf).
   (c) Expectation, Variance. Moments. Interpretation.
   (d) *Moment Generating Function.* Let X be a r.v. and there exists a neighborhood $(-h;h)$ such that $M(t) = E(e^{tX}); t \quad (-h;h)$ is defined. Then $M(t)$ is the *m.g.f* of X. It can be utilized to calculate the moments of a r.v. (therefore, EX, Var(X)). $M^{(r)}(0) = E(X^r)$: Very powerful in calculating the moments of sum of identical independent r.v.'s

3. Expectation and Variance calculation. Review Chapter 4 of Text. Particularly, pay attention to the expectation/variance of linear combination of random variables and the product of random variables.

4. ? (§5.1–§5.2; §5.6) Bernoulli, Binomial, Normal, Poisson distributions and related properties.

Reading and Practice

- Review Chapter 3, 4.
- Read §5.1–§5.2; §5.6.

Homework (due on 030318 in class.)

1. (Taken from Johnson and Bahattacharyya) A student newspaper reports that 30% of undergraduates own a digital MP3 player. This statement, extracted froma survey about physical exercise, is based on the finding that among 10 students who jog for exercise, 3 own an MP3 player.
   (a) Specify the statistical population and the sample
   (b) Comment on the representativeness of the sample

(c) Suggest a better experiment (sampling) design

2.