Chap1:

1. Assumptions

> For Ass 2, distinguish strict and weak exogeneity.
> If we assume that x is unstochastic(fixed regressor), then we don't need the exogeneity assumption.

2. proposition 1.1, 1.2

> don't need to proof but remember the conclusions!

3. hypothesis test

- T
- F(Wald test)

4. GLS

Chap2:

1. convergence in probability and distribution

> Lemmas can be used directly.
> Assumptions, WLLN, CLT need to be write down.

2. ergodic stationary, weak stationary, martingale difference stationary
3. OLS large sample properties

- consistency
- asymptotic normality
- asymptotic variance estimation

4. hypothesis test

- t: t distribution in finite sample, normal distribution in large sample
- F: F distribution in finite sample, Chi2 distribution in large sample

> heteroskedasticity is allowed.

Chap3:

1. definitions

> conditional and unconditional likelihood function
> normal distibution, binominal distibution, logistic distribution
> maximum likelihood estimation(only consider the linear model)

2. Cramer-Rao bound

> find the least variance's estimator in unbiased estimators.
> $\hat{\beta}$ can attain the bound, $\hat{\sigma}^2$ can't.

3. hypothesis test

- linear:
  - Wald:
    - W1: $\sim \chi^2$, if we know σ^2
    - W2: $\rightarrow \chi^2$, we use s^2 to subsitude the unknown σ^2
    - W3=W2/h: $\sim F$, since we use the unbiased $s^2 = SSR/(n-K)$
  - LR: connection with F test
- nonlinear:
  - $W \rightarrow \chi^2$
  - $F = W/h \rightarrow F$
  - $W_Z = \sqrt{W} \rightarrow N$

Chap4:

1. edogeneity from

- omitted variables
- measurement error
- simultaneous equations

> lead to unbiasedness and inconsistency

2. IV
   1. assumptions: correlation, exogeneity
   2. estimation, relations to OLS and GMM
   3. order condition and rank condition
   4. assumptions for large sample(don't need to proof)

5. 2SLS: when just indentified, 2SLS becomes IV.

Chap5:

1. moment/orthogonality condition: population moment, sample moment
2. GMM objective function
3. sample error
4. proposition 3.1, 3.2

- consistency
- asymptotic normality
- asymptotic variance estimation

5. efficient GMM: least variance($\hat{W} = \hat{S}^{-1}$)
6. hypothesis test(proposition 3.6, 3.7, 3.3)

> J test(over identifying restriction test) = GMM objective function
> H_0? df = K - L

7. homoskedasticity

- GMM to 2SLS
- J to Sargan

> asymptotic variance

Chap6:

1. Assumptions: versus SEGMM
2. MEGMM objective function, estimator $\tilde{\delta}$

> when use zipped matrix write down the dimensions.

3. special cases: FIVE, 3SLS, SUR

- Assumptions
- large sample properties(don't need to proof)
- relations

4. SUR versus OLS(Figure 4.1)

Chap9&10:

1. binary choice model
- logit
- probit

> definition, likelihood function, goodness of fit

2. multiple choice model
- orded(extended probit with mutiple hurdles)
- non-orded(extended logit, Gumble ditribution)
  IIA(odds ratio): idependence between two probabilities

3. count data: possion(estimate by MLE), equidispersion(NegBin I & II)

4. Tobit1

- cencered(3 equations, y=0 exists)

> logL1= part1 +part2

- truncated(2 eqution s)

5. Tobit2: 5 parts, sample selection bias=inverse Mill's ratio
6. Heckman 2-step estimation versus MLE

Chap11:

1. GMM conclusions: $\hat{\beta}_{PGMM}$, $\hat{V}[\hat{\beta}_{PGMM}]$
2. IV selection(4 exogeneity assumptions)
3. Chamberlain's optimal distance estimator