

Natural Resource Economics

References:

- Jon Conrad, 《Natural Resource Economics》, Cambridge Press, 1999
Zhang Fan, Environmental and Natural Resource Economics, Shanghai People's Publishing House, 2007

Structure of the Course:

1 Basic Concepts

- 1.1 natural resource and economic system
- 1.2 Lagrange method
- 1.3 the discount rate

2 The numerical solution of resources allocation

- 2.1 The optimal extraction path of non-renewable resources
- 2.2 The optimal use of renewable resources
- 2.3 Lagrange method and Kuhn-Tucker conditions
- 2.4 Numerical solution

3 Dynamic Optimization

- 3.1 Optimal Control Theory
- 3.2 Dynamic Programming
- 3.3 explanation in economics

4 Renewable Resources

- 4.1 The economics of forest resources management(Wood utilization, Multiple benefits, Forest cutting quota management and the development and utilization of the primeval forest)
- 4.2 The economics of forest resources management(Multiple benefits and the development and utilization of the primeval forest)
- 4.3 The economics of fishery resources utilization(Common property resources, The traditional management policy and Bio - economic policy)

5 Non-renewable Resources

- 5.1 The time trajectory of resource utilization
- 5.2 The impact of market structure on resources excavating trajectory: Competitive or monopoly

5.3 Energy market analysis

6 The policy of new energy resources in China

6.1 low-carbon economy, green growth and renewable energy policy

7 Risk and Uncertainty

7.1 Cost-benefit analysis

7.2 The two-stage option value model

7.3 The option value model of infinite time

7.4 The irreversible decision

8 The framework for sustainable development

8.1 renewable resources utilization model

8.2 intergenerational caregiving model

8.3 co-evolution model

8.4 development model of adaptability

9 The problems of non-degradable pollutant

9.1 General problems

9.2 The economic analysis of climate change

Course Objectives:

This course will introduce some simple dynamic optimization methods for students to analyze the issues related to the natural resources utilization. Based on Lagrange method, this course aim to derive the economic conditions of the optimal utilization of resources and use Excel to present the solutions to the main content. Therefore, this course will be both theoretical and feasible.

Pre-requisites

As an applied economics course , some core courses such as intermediate microeconomics and calculus are needed.