シミュレーション

科目番号	情４１１	履修年度	2015年後期
開設学部等	工学部 情報工学科 システム情報工学	期間	後期
曜日時限	金曜日３時限 工1－321	単位数	2
担当教員	アシャリフモハマッド	講義コード	60102200

■授業内容と方法

In this lecture, it is aimed to show how different real world systems could be modeled in a digital computer before making them. The system could be an economic or physical or even a society with definite reaction rules. Therefore, it will be easy to study the behavior of the system, no matter what is the area to be study, simulation helps to model the system in a different environments. For design engineers, managers, or for developing a hospital or hotel or to build a highway etc.all jobs and the persons who are responsible for establishing a new infrastructure, need to know the behavior or side reactions of the new developing system. Simulation is an easy tool to access to virtual reality before having and touching the real system.

■達成目標

・ To understand simulation model, Discrete-Event Simulation (DES), time-advance mechanism in simulation.
・ To analysis single-sever queuing system and job-shop machine in order to evaluate the system from three points of view 1) Average Delay in Queue. 2) Average Number of Customers in Queue. 3) Machine Utilization.
・ To understand Monte Carlo simulation method to solve different problems.
・ To get familiar with basic theory of probability & random variables.
・ Algorithms for generation uniform & non-uniform random variables in simulation.
・ To use variance reduction techniques in simulation.
・ To know about object oriented simulation languages.

■評価基準と評価方法

Quiz 10%+Practical Simulation Work 30%+ Midterm 30%+ LastExam. 30%

■履修条件

Numerical Analysis, Computer Programming

■授業計画

1)The nature of simulation, system, model and simulation.
2)Discrete-event simulation (DES), time-advance mechanisms.
3)Components of a DES model, Simulation of single-server queuing system.
4)Steps in a simulation study.
5)Monte Carlo and other type of simulation, other examples. Buffen's Needles Problem
6)Random variables, c.d.f., p.d.f., Joint and Marginal p.d.f. Geometric, Binomial
7)Poisson, Uniform, Normal, Exponential, Gamma, Chi-Square, Laplace,Logistic,Cauchy, Beta distributions, New random variables for old.
8)Mid -Term Examinations
9)Multidimensional random variables, Jacobian, Convolution.
10)Generating uniform random variables, Dice and machines, Pseudo-Random Numbers
11)Congruential pseudo-random number generators. Chaos System.
12)Particular method for non-uniform random variables.
13)General method for non-uniform random variables.
14)Monte Carlo Integration and Variance Reduction Techniques.
15)Simulation Softwares.

16)Last-Term Examination.

■事前・事後学習

■教科書

	ISBN
Simulation Modeling & Analysis by Averill M . Law W.David Kelton 1991 by McGraw-Hill Inc.	9780071255196
Also see: http://www.mhhe.com/engcs/industrial/lawkelton/	
Elements Of Simulation by Byron J.T.Morgan 1995, Chapman& Hall	0412245906

■参考書

ISBN

■備考(メッセージ)

■オフィスアワー

Tues: 3:00-5:00, Fri:3:00-5:00

■メールアドレス

ura.ie.classes.simulation, asharif@ie.u-ryukyu.ac.jp

■URL

http://www.ie.u-ryukyu.ac.jp/~asharif/pukiwiki/index.php