

Advanced Network Modeling

This course is designed to introduce advance concepts related to computer network modeling such as queuing, scheduling and discrete event simulation with focus on their implementation.

Synopsis:

Computer Networks are an integral part of any project, in which data or information needs to be transferred from one computing station to another computing station. Practically, it is not possible for every researcher to work on real hardware. So, we use tools to simulation computer networks. During simulation, we have to generate all those scenarios, which may occur when a network is in operation.

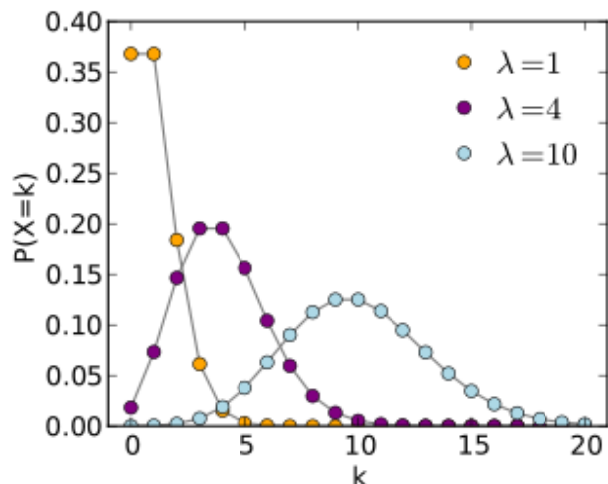
In this course, we will learn the concepts used to understand network operations and to re-create them. Also, we will learn how to record statistics of different protocols and compare them. After learning and clearing each concept, we will implement it to cement its clarity. We will be using Matlab build r2008a or above for simulations as it has support for Object Oriented Programming.

Instructor

Dr. Syed Muhammad Khaliq-ur-Rahman Raazi is an Assistant Professor in Karachi Institute of Economics and Technology since April 2011. He received his PhD in Wireless Sensor Networks from Kyung Hee University, South Korea in 2010. Before that, he did his MS in Computer Science from LUMS and BE in Computer Software from NUST. In addition to that, he has industry experience of a couple of years. His research interests include Ad Hoc Networks, Wireless Body Area Networks, Content-Based Communication and Ubiquitous Computing.

Course Outline

- Network Entity Classes & Objects
- Simulation Options & Result Compilation
- Discrete Event Simulation
- Random Numbers & Random Variates
- Discrete & Continuous Distributions
- Introduction to Protocol Implementation
- Spanning Tree Protocol Implementation
- Queuing & Scheduling
- Single Server Queues, M/M/1 queues
- Multi-server queues implementation



Books

Although no specific textbook will be followed but following books will prove to be useful:

1. Mohsen Guizani, Ammar Rayes, Bilal Khan, Ala Al-Fuqaha, "Network Modeling and Simulation: A Practical Perspective", Wiley-2010