One-day workshop on

Queueing Theory and Optimization: Computational Aspects and Its Applications

School of Basic Sciences

IIT Bhubaneswar

Program Schedule

Date: 5th March, 2015

Time:	Program:
8:30 AM – 9:00 AM	**Registration**
9:00 AM – 9:30 AM	**Inauguration**
Snacks	
Session 1 **Chairperson: Prof. Swadhin Pattanayak**	
9:45 AM – 10:45 AM	Speaker: **Prof. M. L. Chaudhry** **Title of the talk:** Roots of Problematic and High Degree Polynomials and Transcendental Equations that occur in Queueing and Computer related problems. **Abstract:** Roots of equations involving high degree polynomials and transcendental functions play an important role in many stochastic processes such as queueing, reliability and random walks. Several researchers have expressed concerns regarding the evaluation of such roots. Kleinrock states in his book "**one of the most difficult parts** of this method of spectrum factorization is to solve for the roots." Neuts states in a paper by Shaler Stidham "In discussing matrix-analytic solutions, I had pointed out that when the Rouché roots coincide or are close together, the method of roots could be numerically inaccurate." In a recent paper, while dealing with a complex batch service queueing system with batch size dependent service, Bar-Lev et al. state that, in practice, the general solution of their problem requires calculation of roots of a complicated equation which, in practice, can result in numerical inaccuracies when the decision variable assumes a large value. The purpose of this talk will be to trace the history of root finding and respond to above questions and show how easily and accurately the roots can be found using recent advances in computer science and software packages provided enough precision, which is readily available on such packages, is used.
10:45 AM – 11:00 AM	**Open questioning from audience**
11:00 AM – 11:30 AM	Speaker: **Dr. P. Vijayalaxmi** **Title of the talk:** Optimum Service Times in a Bernoulli Schedule Vacation Interruption Queue with Balking and Reneging using Ant Colony Optimization **Abstract:** This study is focused on a finite buffer multiple working vacations queue with balking, reneging and Bernoulli schedule vacation interruption. Arriving customers decide either to join the system or to balk. After joining the queue the customers may renege based on their desire for service or their unwillingness for waiting. At a service completion instant during working vacations, the server can decide either to continue the vacation with probability q or interrupt the vacation and resume regular service period with probability $1 - q$. The inter-arrival times of customers are assumed to be arbitrarily distributed. Service times during a regular service period, during a working vacation period and vacation times are assumed to be exponentially distributed and are mutually independent. Using recursive technique, the steady state system length distributions at various epochs are obtained. Further, using the ant colony optimization cost analysis is performed and some numerical results showing the effect of model parameters on key performance measures are presented.
11:30 AM – 11:45 AM	**Open questioning from audience**

11:45 AM – 12:15 PM	Speaker: **Dr. Tripti Chakrabarti** **Title of the talk:** A EPQ inventory model with Stochastic Demand, finite production rate of Deteriorating items, Shortages and two-level of credit financing **Abstract:** An inventory model for deteriorating items and shortages with finite production rate and stochastic demand rate is developed when the supplier offers delay period to the retailer for due payment against purchases and the retailer in turn extends the trade credit offer to its customers. This policy of passing on of the credit period is well known as two-level of credit financing. Items in the system follow stochastic demand behavior that are produced with finite production rate and subjected to constant rate of deterioration. The model is developed with an objective to minimize total expected cost of retailer as it is assumed to be a dominant player in the supply chain. A special case is made by taking time dependent deterioration. A numerical example is provided using LINGO software. Sensitivity analysis of various parameters is carried out to gain meaningful managerial insights.
12:15 PM – 12:30 PM	**Open questioning from audience**
Lunch Break	
Session 2 **Chairperson: Prof. Vasudeva Rao**	
1:30 PM – 2:00 PM	Speaker: **Dr. Veena Goswami** **Title of the talk:** Applications of Queueing Theory **Abstract:** Queueing theory constitutes a powerful tool in modelling and performance analysis of many complex systems, such as computer networks, cloud computing, telecommunication systems, call centers, traffic control, health services, flexible manufacturing systems and service systems. Queueing models are useful in formulation of optimal decision on construction and service organizations from client and manager viewpoint.
2:00 PM – 2:15 PM	**Open questioning from audience**
2:15 PM – 2:45 PM	Speaker: **Dr. A. K. Ojha** **Title of the talk:** Multi-objective geometric programming problem **Abstract:** In multi-objective geometric programming problem there are more than one objective functions. There is no single optimal solution which simultaneously optimizes all the objective functions. Under these conditions the decision makers always search for the most “preferred” solution, in contrast to the optimal solution. A few mathematical programming methods namely fuzzy programming, goal programming and weighting methods have been applied in the recent past to find the compromise solution. $\in$-constraint method can be applied to find the non-inferior solution. Further, the multi-objective programming problems can be solved by the fuzzy programming technique to find the optimal compromise solution.
2:45 PM – 3:00 PM	**Open questioning from audience**
High Tea	

Session 3 **Chairperson:** Prof. M. L. Chaudhry	
3:15 PM – 3:45 PM	Speaker: **Dr. S. Pani** **Title of the Talk:** Variational Inequalities and Optimization Problems. **Abstract:** The theory of variational inequalities is used to solve partial differential equations, optimization problems, and several engineering problems. These problems are in general infinite dimensional problems, with this a closely related problems are complementarity problems which studies these problems in finite dimensional cases. In this talk the general theory, some of its application and it generalizations will be discussed.
3:45 PM – 4:00PM	**Open questioning from audience**
4:00 PM – 4:30PM	Speaker: **Dr. A. D. Banik** **Title of the Talk:** Working Vacation Queueing Model with Batch Arrival and its Application to Ethernet Passive Optical Network and VoIP H.323. **Abstract:** This paper analyzes renewal input batch arrival queues with multiple and single working vacation policy. We obtain the steady state system-length distributions at pre-arrival and arbitrary epochs. The Laplace-Stieltjes transforms (LST) of the sojourn time distribution for the first customer and an arbitrary customer in an accepted batch have been derived. Also the probability density function of sojourn time distribution for the first customer in an accepted batch has been obtained. The proposed analysis is based on the roots of the characteristics equations formed using the probability generating functions (p.g.f.) of embedded pre-arrival epoch probabilities. Several performance measures such as the mean system-length and mean sojourn times of first and an arbitrary customer in an accepted batch are presented. The suggested queues have potential application in Ethernet passive optical network (EPON) and VoIP H.323.
4:30 PM – 4:45PM	**Open questioning from audience**
Certificate distribution	