

## Multi-Objective Optimization and Fuzzy Control Applications in Banking and Financial Problems

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**Abstract:** Banks and Financial Institutions are dynamic systems where (i) decision making strategies are applied for achieving business objectives such as maximization of profit, maximization of value of shareholders equity and minimization of risks, and (ii) control strategies are applied for achieving operational management goals corresponding to objectives such as maximization of efficiency, minimization of failures and minimization of frauds. When multiple objectives are considered we formulate them as multi-objective optimization problems and then solve to obtain final decision which is Pareto optimal. Objectives give the direction and goals or target values give the milestones to be achieved in the path of progression. Controlling the inputs dynamically to achieve the desired goals is challenging in non-linear, multi-objective and uncertain environment. Here we present Optimization Models of three Critical Problems of Bank's Risk Management, Asset Liability Management and Financial Portfolio Selection and illustrate their solution. Design of a Fuzzy Controller for Asset Liability Management is also presented.



Bio sketch of the speaker: Dr. V.N.Sastry is presently working at the Institute for Development and Research in Banking Technology (IDRBT), established by the Reserve Bank of India, since 1999. He has obtained his Ph.D. Degree and Master's Degree from the Indian Institute of Technology (IIT), Kharagpur in 1994 and 1987 respectively. He has graduated with Honors from the University of Calcutta in 1985.

Prof. Sastry's main areas of research interest include – Operations Research, Multiple Criteria Decision Making, Quality of Service (QoS) based Network Routing Algorithms, Financial Risk Modelling, Portfolio Optimization and Asset Liability Management, Access Control Models, Mobile Computing, Secure Mobile Payments, Mobile Banking, Mobile Cloud and Mobile Governance. He has guided several graduate students for PhD and master's degrees and published over 60 research papers in Journals and Conferences of International repute.

Dr. Sastry is a Co-founder and Executive Secretary of the Mobile Payment Forum of India (MPFI), and has contributed to the development of IBA-IDRBT Technical Standards for Financial Inclusion, IBA-UIDAI Micro-ATM standard, Interoperability Standards for Mobile Payments, Security Standards for Mobile Payments, etc.

He delivered invited Lectures in several leading Institutions and Universities both in India and abroad and has initiated and conducted several short-term programmes on Mobile Banking Technologies. He is also the founder and Head of the Mobile Banking Security Lab (MBSL) at IDRBT, which offers 48 experiments of basic and advanced levels covering Mobile Communication, Mobile Banking and Mobile Security. He is coordinating to set up similar MBSL at Kenya School of Monetary Studies (KSMS), Kenya. He is the Chairman of the Expert Committee on Mobile Governance constituted by the Govt. of India (DEITY, MCIT). He has passion for music, art and application of mathematical techniques in solving real life problems, and enabling affordable technologies to reach common man's needs such as banking, education and online secure mobile services.