UNIVERSITÀ DEGLI STUDI DI SALERNO
Dipartimento di Fisica "E. R. Caianiello" e Dipartimento di Matematica

in convenzione con

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Tesi di dottorato

MAP/PH/1 systems with group service: performance analysis under different admission strategies

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Abstract

Recent advances in wireless communication networks led to possibility of multi-rate transmission of information. The queueing theory represents a valid tool to study how the performances of such communication systems can be improved, and to give proper solutions.

Modeling a multi-rate transmission system, in terms of queueing theory, means that a particular discipline has to be considered: a group of requests from users can be processed simultaneously in parallel and processing of the whole group is supposed finished if processing of all individual requests belonging to this group is over. In order to model this typology of telecommunication systems, some particular assumption can be made on arrivals, which occur by a Markovian arrival process, and on service time and length of admission period, which are regulated by phase type distributions. Thus, in this thesis $MAP/PH/1$ queueing systems have been considered, with and without retrial to take into account all possible behaviours of the customers.

The main goal of the research activity presented in this work is to introduce novel admission strategies for the described systems, in order to give a major contribute to the current performance analysys, in particular as regard the choice of the optimal length of admission period and optimal size of the groups.

Dynamics of such systems are described by multidimensional Markov chains. Ergodicity condition for these Markov chains have been derived, stationary probability distribution of the states have been computed, formulas for the main performance measures of the system have been attained. Essential advantages of the proposed customer's service disciplines have been numerically illustrated.