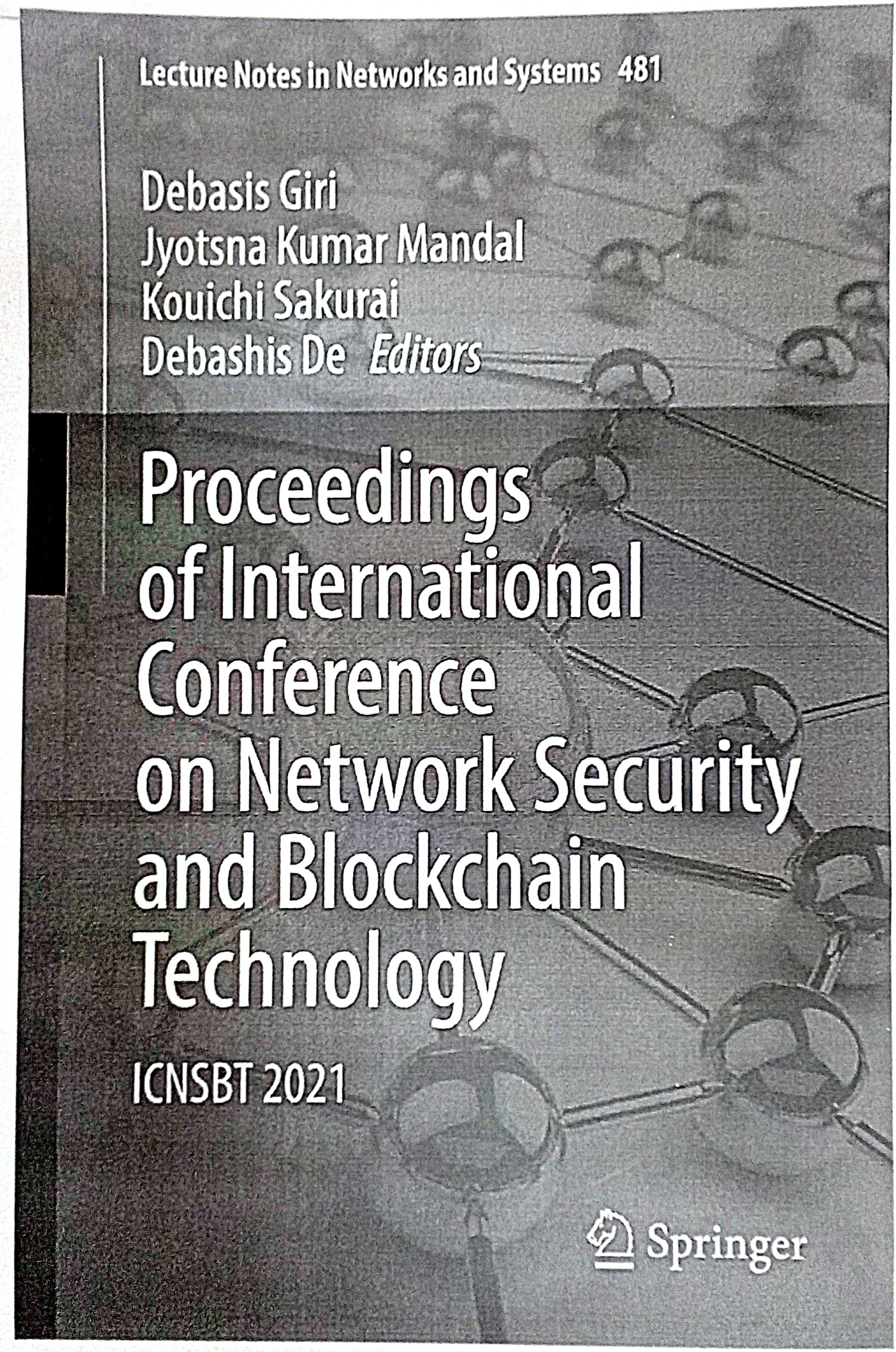
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Performance Analysis of Retrial Queueing System in Wireless Local Area Network

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Abstract. General service batch arrival feedback retrial G-queue with vacation is considered. Along with the essential service, the server provides service in S phases. There are several different optional services available at each level. The server's status determines whether or not each individual customer is admitted to the system. According to the Poisson process, positive customers arrive in batches. When a negative consumer enters the system, the server goes down and the customer in service is removed from the system. The failing server is immediately dispatched for repair. If the server is idle, one of the admitted customer instantly enters the service and the others join the orbit; otherwise, all admitted customers enter the orbit. After the completion of essential or optional services, the server may join the queue if they are dissatisfied with the service. The server will leave on vacation with certain probability, after providing service to a customer. The system's probability generating functions are carried out using the supplemental variable approach, and various performance measurements are developed. Stochastic decomposition property is verified and the special cases are deduced. The joint distributions of the server state and the number of customers in the retrial group are obtained. The influence of parameters on system performance metrics is investigated.

Keywords: Retrial G-queue · Optional service · WLAN · System performance

1 Introduction

Many researchers have examined retrial queues with server vacations, notably Choudhury and Ke [6] and Bagyam and Udayachandrika [4]. The stochastic modelling of many real-life circumstances leads to the use of a retrial queueing model with feedback. For example, in data transmission, a packet transported from the source to the destination may be returned, and this process may be repeated until the packet is entirely delivered. This form of retransmission is referred to as feedback. Arivudainambi and Gowsalya [2] analyzed a two types of service with feedback retrial queue and Bernoulli vacation. Pankaj Sharma [13] studied a repairable faulty server queueing model with Bernoulli feedback, as well as a modified vacation strategy.

Many batch arrival queueing systems have a constraint that prevents all clients from joining the system at the same time. This policy is named as admission control policy.

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