A Note on an $M/G/1$ Queue with a Waiting Server, Timer and Vacations

O.J. Boxma, S. Schlegel and U. Yechiali

Abstract

We analyze a generalized protocol of an $M/G/1$ queue with server vacations where after returning from a vacation to an empty system, the server (as in many real-life situations and common also to human behaviour) activates a Timer and waits dormant. If an arrival occurs before the Timer expires, a busy period starts immediately. If the Timer is shorter than the inter-arrival time, the server does not wait any more and leaves for a new vacation, etc. We derive transforms and performance measures of the system’s key variables and show how the general results reduce to their two extreme cases: (i) zero Timer yields the multiple vacation model and (ii) infinite Timer yields the single vacation case.

1 Introduction

Two important extensions of the classical $M/G/1$ queue, which have been studied extensively in the literature, are the multiple and single vacation models (see Levy and Yechiali [1975], Takagi [1991] and references there).