AN EXTENSION OF THE FLUID FLOW APPROXIMATION TECHNIQUE

I.M. Premachandra
Dept. of Industrial Management, University of Kelaniya.

In day to day life, we often come across situations where queues are formed up. A multiaccess computer system where many users are permitted to access the computer simultaneously through remote consoles is a typical example. Here the jobs fed to the computer by different users can form a queue around the CPU (Central Processing Unit).

The general tendency in analysing queueing systems is to get exact solutions through probability theory for simple models only. Probability theory often fails to tackle complex situations due to tedious computations involved in finding out the roots of the differential equations. In such cases we resort to using approximate techniques such as Fluid Flow Approximation method.

The Fluid Flow Approximation technique gives good approximate values for queueing systems under heavy traffic ($p=\frac{\lambda}{\mu}>1$) conditions but one of the serious drawbacks of the method is that it is not applicable for light traffic cases.

The purpose of this paper is to extend this technique for light traffic ($p=\frac{\lambda}{\mu}<1$) systems. The mathematical basis of the technique is developed. The accuracy of the approximate values is checked by comparing them with exact and simulated values for various queueing systems. The results show that the proposed method could be used for analysing systems in light traffic conditions as well.