The paper presents a short overview of two approximation techniques that may be appropriate to estimate performance measures of queueing systems with non-Poisson offered traffic and finite queue. The techniques evolved from similar techniques originally designed for pure loss systems [1,3], recently generalized to systems with infinite queue [4].

Consider the queueing system GI/M/N/\infty, in which renewal traffic is offered to N exponential servers and a finite number Q of waiting places. Customers that arrive when the total system capacity N+Q is fully occupied are lost from the system and do not return. We report a study on approximation techniques to estimate the performance measures of queueing loss systems [1,3], recently generalized to the case of non-Poisson traffic M' \overset{\text{approximation}}{\Rightarrow} M = \frac{N}{N'}, N' = N/M', Q' = N/Z', Q = N/Z.

For the class of pure waiting systems GI/M/N/\infty, approximation (7) with Q' = \infty has also been introduced in [4].

Third, we take into consideration a Hayward-variation of (6), recently published by Whitt [6], where:

\begin{align*}
(6) & \quad B = B' = \beta(M', N', Q'), \\
(7) & \quad W = W' = \omega(M', N', Q'), \\
(8) & \quad T = T' = t(M', N', Q'),
\end{align*}

where

\begin{align*}
M' &= M/Z', \\
N' &= N/Z', \\
Q' &= Q/Z.
\end{align*}

We present several numerical results of these approximations and exact analysis for Zc1. It can be seen that the approximations perform well (and often extremely well) in a large range of the server occupancy p=M/N (low and heavy traffic).

REFERENCES.


