

6 CONCLUSION

The paper proposes an accurate and computationally efficient approach for analyzing closed queueing networks containing fork-join systems. The core of this method involves establishing auxiliary open job classes to simulate the behavior of the original parallelism. This transformation leads to a mixed queueing network model that can be solved by analytic method. Compared to the well-established Heidelberg-er-Trivedi method, which uses an one-to-one fashion to create auxiliary closed job classes for each parallel path, our approach produces one auxiliary open job classes for the entire fork-join systems. The evaluation results show that our method achieves lower error rates. Meanwhile, the proposed method is faster than the baseline method since our transformed network has less number of job classes that requires less analytic computations. In addition, the design of our transformation enables us to deal with nested fork-join system, which is a notable advantage. Hence, this paper contributes a simple yet effective fork-join transformation which has the potential to be of great value in areas of the concurrent system research. An extended version of the work presented in this paper is available in [10].

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