

Chapter 6

Conclusion

In this thesis, we have analyzed the single server queueing system $C_k/C_m/1$. We construct the general solution space for the vector of stationary probability and describe the solution space in terms of singularities and vectors of the fundamental matrix polynomial $\mathbf{Q}(\omega)$.

There is a relation between the singularities of $\mathbf{Q}(\omega)$ and the roots of the characteristic polynomial involving the Laplace transforms of the interarrival and service times distributions.

We establish a procedure for solving stationary probabilities. It is easy when the m roots of the characteristic polynomial are distinct, each vectors used in the expression of stationary probabilities are described in terms of Kronecker products. When multiple roots occur, one needs to solve a set of equations of matrix polynomials. To express those vectors as linear combination of Kronecker products, the method introduced at the end of chapter 5 maybe useful.