

Contents

Abstract	i
中文摘要	ii
論文結構	iii
1 Introduction	1
2 Analysis of $C_k/C_m/1$	4
2.1 Interarrival and Service Times	4
2.2 Assumption and Problem Description	6
2.3 Matrix of Transition Rates	7
2.4 State Balance Equations	8
3 Solution Spaces	9
3.1 Left Jordan Chains	9
3.2 The Structure of the Solution Space	11
3.3 General Solution Forms	15

4 Singularities of $\mathbf{Q}(\omega)$ in the Open Unit Disk	21
4.1 $\mathbf{Q}(\omega)$ and Laplace Transform Equation	21
4.2 A Special Case of Simple Roots	24
5 A Method of Constructing Solution Spaces	28
5.1 Cases of Simple roots	28
5.2 Cases of Multiple Roots	32
5.3 Examples of $\ell_\alpha \leq 4$	32
6 Conclusion	43
Bibliography	43
Appendix A	46
Appendix B	47
Appendix C	48
Appendix D	49
Appendix E	50