

Contents

1	Introduction	1
2	The efficiency of bus rapid transit (BRT) systems	3
2.1	Introduction	4
2.2	The model and equilibrium under mixed-traffic conditions	6
2.2.1	Basics	6
2.2.2	Equilibrium with time-invariant prices	9
2.3	First best	13
2.4	Optimum in mixed traffic with time-invariant prices	15
2.5	Bus rapid transit (BRT)	17
2.5.1	Analytical results	17
2.5.2	Numerical analyses	21
2.6	Conclusions	24
3	Rush hour frequency management	27
3.1	Introduction	28
3.2	Two-frequency equilibrium	30
3.3	Frequency optimization	36
3.4	Numerical analyses	39
3.5	Conclusions	43
4	Conclusions	46
5	Bibliography	49
A	Appendix A	50
A.1	Equilibrium with intermittent bus capacity	50
A.2	Proof of Proposition 2.2	56
A.3	Proof of Propostion 2.3	59
A.4	Proof of Proposition 2.3	60
A.5	Calculations and results for Section 2.5	61
A.5.1	Proof of Proposition 2.5	61
A.5.2	Calculations for the optimal price difference and frequency with perfectly divisible capacity (BRT-DC)	63
A.5.3	Calculations for the optimal period of operation for buses with perfectly divisible capacity (BRT-DC)	64
A.5.4	Calculations for the case of indivisible capacity (BRT-IC)	64

B	Appendix B	66
B.1	Proof of Proposition 3.1	66
B.2	Proof of Propositions 3.2	70
B.3	Proposition B.2	72
B.4	Numerical analysis results	76