

Contents

Introduction	1
1 Nash Equilibrium Approach	3
1.1 The Model	3
1.1.1 The Dispatch Program	3
1.1.2 The Bidders	5
1.2 Existence of Noncooperative Equilibrium	7
1.2.1 Example were no pure strategy Nash equilibrium exists	8
1.3 Bilevel Optimization	11
1.4 Algorithms for Nash Equilibrium	14
1.4.1 Lemke Howson Algorithm	14
1.4.2 Example	16
1.4.3 Vertex Enumeration	18
1.4.4 Tableau	18
1.4.5 N-Players Algorithm	20
1.5 Piecewise linear strategies	25
1.5.1 Modeling Piecewise linear functions	25
1.5.2 ISO solution for 2 pieces linear bid	26
1.6 Procedure	32
1.7 Numerical Results For Piecewise Linear bids	33
1.7.1 2 pieces Linear function	33
1.7.2 Changing discretization length	33
1.7.3 Changing The PriceCap	34
1.7.4 Changing \bar{q}	35
1.7.5 Sensitivity Analysis	36
1.8 Quadratic strategies	43
1.9 Numerical Results for Quadratic bids	46
1.9.1 Sensitivity Analysis	49
1.10 Simulations with small resistances	50
2 Scenarios Approach	52
2.1 Linear Bids	54
2.1.1 Convergence result for Linear Bids	55
2.2 Piecewise Linear case	58
2.2.1 Convergence result for Piecewise Linear Bids	59
2.3 Numerical results	60

2.3.1	Procedure	60
2.3.2	Numerical results for 2 Players	61
2.3.3	Sensitivity Analysis	63
2.3.4	Numerical results for 3 Players	65
2.3.5	Experimenting with different probabilities	67
2.3.6	Using different slopes	70
2.3.7	Non linearities	71
2.4	Quadratic Bids	73
2.4.1	Simulations with small resistances	75
	Conclusion	76
	Bibliography	78