Contents

1 Background Introduction .......................................................... 1
  1.1 Introduction .......................................................... 1
  1.2 Contract Theory: Fundamentals and Classification ....................... 3
    1.2.1 Basic Contract Concepts ........................................ 3
    1.2.2 Classification .................................................. 4
    1.2.3 Models ...................................................... 7
    1.2.4 Comparisons .................................................. 8
  1.3 Contract Theory: Reward Design ......................................... 9
    1.3.1 Dimension of Rewards .......................................... 9
    1.3.2 Rewards on Absolute Performance or Relative Performance ............. 11
    1.3.3 Reward in Bilateral or Multilateral Contracting .................... 12
  1.4 Applications in Wireless Networks ..................................... 12
    1.4.1 Adverse Selection ........................................... 13
    1.4.2 Moral Hazard ............................................... 13
    1.4.3 Mixed Problem ............................................... 14
  1.5 Summary .............................................................. 15

References .................................................................. 15

2 Incentive Mechanisms for Device-to-Device Communications in Cellular Networks with Adverse Selection ......................... 17
  2.1 Introduction .......................................................... 17
  2.2 Related Work .......................................................... 20
  2.3 System Model .......................................................... 21
    2.3.1 Transmission Data Rate ....................................... 21
    2.3.2 User Equipment Type ......................................... 22
    2.3.3 Base Station Model .......................................... 22
    2.3.4 User Equipment Model ....................................... 23
    2.3.5 Social Welfare ............................................... 23
3 Incentive Mechanism in Crowdsourcing with Moral Hazard

3.1 Introduction

3.2 System Model

3.3 Problem Formulation

3.4 Simulation Results and Analysis

3.5 Summary

References

4 Tournament-Based Incentive Mechanism Designs for Mobile Crowdsourcing

4.1 Introduction

4.2 System Model

4.3 Problem Formulation

4.4 Simulation Results and Analysis

4.5 Summary

References
5 Multi-dimensional Payment Plan in Fog Computing with Moral Hazard

5.1 Introduction .......................................... 73
5.2 System Model. ......................................... 75
  5.2.1 Operation Cost .................................. 75
  5.2.2 QoS Measurement. ............................... 77
  5.2.3 Payment Plan ................................... 77
  5.2.4 Utility of Fog Node .............................. 78
  5.2.5 Utility of Network Operator ..................... 81
  5.2.6 Social Welfare ................................... 81
5.3 Problem Formulation ................................... 82
5.4 Simulation Results and Analysis ......................... 83
5.5 Summary ............................................ 87
References ................................................ 87

6 Financing Contract with Adverse Selection and Moral Hazard for Spectrum Trading in Cognitive Radio Networks ............. 89
6.1 Introduction .......................................... 89
6.2 Related Works ........................................ 91
6.3 System Model. ......................................... 92
6.4 Problem Formulation ................................... 93
  6.4.1 PU’s Payoff Maximization Problem ............... 94
  6.4.2 Optimal Contract with Moral Hazard only ......... 95
  6.4.3 Optimal Contract with Adverse Selection only ... 95
  6.4.4 Optimal Contract with both Adverse Selection and Moral Hazard ................................ 96
6.5 Simulation Results and Analysis ......................... 97
  6.5.1 Financing Contract Analysis ....................... 97
  6.5.2 System Performance .............................. 100
6.6 Summary ............................................ 103
References ................................................ 103

7 Complementary Investment of Infrastructure and Service Providers in Wireless Network Virtualization ................... 105
7.1 Introduction .......................................... 105
7.2 System Model. ......................................... 107
  7.2.1 Cost and Revenue Functions ...................... 108
  7.2.2 Shapley Value ................................... 109
  7.2.3 Investment Surplus ............................... 110
7.3 Problem Formulation ................................... 110
  7.3.1 General Case .................................... 110
  7.3.2 Single Provider and Single Resource .............. 111
  7.3.3 Non-integration .................................. 111
  7.3.4 Infrastructure Integration ......................... 112
Contract Theory for Wireless Networks
Zhang, Y.; Han, Z.
2017, XII, 121 p. 35 illus., Hardcover
ISBN: 978-3-319-53287-5