

# 主 論 文 要 旨

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| 報告番号                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 甲 乙 第 | 号 | 氏 名 | 岡本 実哲 |
| 主 論 文 題 名 :<br>Essays on Mechanism Design                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |   |     |       |
| (内容の要旨)<br><p>This thesis is a collection of three essays on mechanism design.</p> <p>I study three economic problems on auction theory, matching theory, and social choice theory. In each problem, I design a mechanism which satisfies "desirable properties", such as <i>efficiency</i>, <i>fairness</i>, and <i>incentive compatibility</i>.</p> <p>In Chapter 1, I study multi-unit ascending-bid auctions. Lawrence M. Ausubel (2004) introduces a new ascending-bid auction rule for multiple homogeneous objects, called <i>the Ausubel auction</i>, which is a dynamic counterpart of the Vickrey auction. He claims that in the Ausubel auction with private values, sincere bidding by all bidders is an ex post perfect equilibrium, which is a tuple of strategies constituting ex post equilibria at all nodes of the dynamic auction game. However, I show that this claim does not hold in general. In my counterexample, there exists a node at which sincere bidding by all bidders is not an ex post equilibrium. I then examine properties of the sincere bidding equilibrium. Finally, I provide two modifications of the Ausubel auction in which sincere bidding by all bidders is an ex post perfect equilibrium.</p> <p>In Chapter 2, I study a rescheduling problem in the Ground Delay Program. The Ground Delay Program is an air traffic control program in the United States. When inclement weather strikes an airport, the airport needs to reduce arrival slots and reassigns flights to available slots. I first show that FAA's current mechanism may not maximize the number of flights assigned to available slots. To resolve this inefficiency, I introduce a new efficiency criterion, <i>universal non-wastefulness</i>. Then, I design a new mechanism that satisfies <i>universal non-wastefulness</i> and a fairness requirement. Furthermore, I show that no airline has an incentive to misreport flight delay under our mechanism.</p> <p>In Chapter 3, I study voting rules. Jean-Charles de Borda (1774) provided an example in which the plurality rule selects an alternative, so-called</p> |       |   |     |       |

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(3)

*pairwise-majority-loser*, which is defeated by any other alternative in pairwise comparison. To avoid selecting such an alternative, he introduced a new social choice rule, called *the Borda rule*. A social choice rule satisfies *Borda's criterion* if it never selects a pairwise-majority-loser. I show that the Borda rule is the only social choice rule which satisfies *anonymity, neutrality, consistency, continuity*, and *Borda's criterion*.