

# Aggregate Correct Revelation and Nash Equilibrium Strategies in Planning Algorithms with Externality\*

KIMITOSHI SATO<sup>†</sup>

## Abstract

This paper generalizes the procedure developed by Fujigaki (1982) by imposing a condition of *Aggregate Correct Revelation* in the sense that the sum of the Nash equilibrium strategies always coincides with the aggregate value of the correct marginal profits affected by externality. Under myopia assumption, each player's Nash equilibrium strategy in the local incentive game associated at any iteration of the procedure is proved to reveal his/her marginal profit in the aggregate. The procedure renamed *the Generalized X Procedure* can possess desirable properties shared by continuous-time locally strategy proof planning procedures, i.e., feasibility, monotonicity and Pareto efficiency. Different from the Fujigaki's Procedure, the Generalized X Procedure can revive neutrality, which enables to distribute an amount of the social surplus generated at each iteration of the procedure, more to the sufferers and less to the causers of externality. This paper compares the structures of the Generalized MDP Procedure and the Generalized X Procedure and points out the crucial difference between them. It is shown that the Generalized X Procedure is characterized with LSP or ACR. An alternative characterization theorem of locally strategy proof procedures with externality is given by making use of the condition, Transfer Independence.

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**Key Words:** aggregate correct revelation, externality, Generalized MDP Procedure, Generalized X Procedure, local strategy proof, neutrality, transfer independence

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<sup>†</sup>The Center for Advancement of Higher Education, Tohoku University, Part-time Lecturer