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APPLICATION OF BAYESIAN STATIC GAMES IN RIVER WATER QUALITY MANAGEMENT

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Abstract

One of the imperative concerns in river water quality management is to develop pollution control strategies, which are satisfactory for all pollution load dischargers. The game theory can be applied for modeling the natural process of decision making among dischargers under the condition of having just one water quality checkpoint in a river reach, which receives pollution loads of several dischargers who would be penalized for any water quality violation from the standards. In this paper, a new methodology called N-person Bayesian Static Game, which is capable of incorporating the existing uncertainties in pollution loads of dischargers, is proposed for river quality management. This methodology can provide the Nash-Bays Equilibrium (BNE) of waste load allocation strategies. The practical utility of the developed methodology is investigated by applying it to a reach of the Zarjub River in north of Iran. This reach includes three pollution load dischargers.

Key words: game theory, N-person bayesian static game, Nash-Bays Equilibrium (NBE), waste load allocation, the Zarjub river

Received: April, 2012; Revised final: September, 2012; Accepted: October, 2012

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