INTELLIGENT DECISION SUPPORT SYSTEM FOR
MULTIOBJECTIVE OPTIMIZATION PROBLEMS
IN SERIOUS GAME

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ABSTRACT

Multiobjective optimization problems are often faced in computational optimization, only a few problems in single objective. One of the multiobjective optimization problems is supply chain problem in electrical energy especially in production of electric power. That problem is included economic and emission dispatch (EED).

This research builds an Intelligent Decision Support System (IDSS) to solve multiobjective optimization problems in Serious Game for EED problems. This IDSS is consisted of five stages such as modeling, optimization clustering, scenario generator and decision making. In first stage, it is builded an modeling for EED problems. Optimization stage, based on NSGA2, is builded to search optimum value of the problems. Clustering stage with FLVQ method is used to cluster decisions to be smaller. Scenario generator stage is builded to produce scenario that decision maker or player wants to learn it. The last stage is decision making by player.

The results of research that use clustering with FLVQ method show us that clustering with two clusters produce error at 2.6413E-08 and for three clusters produce error at 4.9371E-08 for multiobjective problem with two objective functions. While for multiobjective problem with three objective functions clustering with two clusters produce error at 3.0261E-08 and for three clusters produce error at 2.8515E-08. This research combines IDSS with Serious Game. This Serious Game uses Game Based Learning method to teach a decision maker to make a decision. Scenario generator gives some problems for player to solve that problem in order that decision maker can learn his decision.

Key Words: Multiobjective Optimization Problem, NSGA2, Clustering, Intelligent Decision Support System, Serious Game.