APPLICATION OF PARTICLE SWARM OPTIMIZATION ON ECONOMIC POWER DISPATCH

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ABSTRACT

This thesis is about the application of Particle Swarm Optimization (PSO) on economic power dispatch. The purpose is to understand the concept of economic power dispatch and formulate the concept of economic power dispatch into optimization problem. In this thesis, Particle Swarm Optimization (PSO) is used as method of optimization for economic power dispatch. The power system will consider three-generators with three-bus in terms of real power and assumption is made for power system as thermal plant with lossless on transmission lines. MATLAB will be used as software tool for analyze and solving the economic power dispatch problem. The result indicates the applicability of the proposed method on economic dispatch of power system.

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CHAPTER 1

INTRODUCTION

1.0 BACKGROUND ON ECONOMIC DISPATCH IN POWER SYSTEM

The increasing demand of electrical supply for residential, commercial and industrial sectors had given rise to electrical generation which power utility's price has been concern to the public where power utilities provider try to find economic way to generate electricity while still meet the demands at optimum cost with less impact on consumer's price on power utilities. In power system, economic dispatch (ED) is a concept to achieve optimum cost of electrical generation.

The definition of economic dispatch provided in EPAct section 1234 is the operation of generation facilities to produce energy at the lowest cost to reliably serve consumers, recognizing any operational limits of generation and transmission facilities[1]. Accurately, ED is a computational process where the total required generation is distributed among the generation units in operation, by minimizing the selected cost criterion, subject to load and operational constraints. For any specified load condition, ED determines the power output of each plant (and each generating unit within the plant) which will minimize the overall cost of fuel needed to serve the system load[2]. The primary objective of economic dispatch is to minimize the total cost of generation while honoring the operational constraints of the available generation resources[3]. ED is used in real-time energy management power system control by most programs to allocate the total generation among the available units. ED focuses upon coordinating the production cost at all power plants operating on the system[4].