

## Optimization of Pumping Power of Water between Reservoir Using Ant Colony System

**Authors :** Thiago Ribeiro De Alencar, Jacyro Gramulia Junior, Patricia Teixeira Leite Asano

**Abstract :** The area of the electricity sector that deals with energy needs by the hydropower and thermoelectric in a coordinated way is called Planning Operating Hydrothermal Power Systems. The aim of this area is to find a political operative to provide electrical power to the system in a specified period with minimization of operating cost. This article proposes a computational tool for solving the planning problem. In addition, this article will be introducing a methodology to find new transfer points between reservoirs increasing energy production in hydroelectric power plants cascade systems. The computational tool proposed in this article applies: i) genetic algorithms to optimize the water transfer and operation of hydroelectric plants systems; and ii) Ant Colony algorithm to find the trajectory with the least energy pumping for the construction of pipes transfer between reservoirs considering the topography of the region. The computational tool has a database consisting of 35 hydropower plants and 41 reservoirs, which are part of the southeastern Brazilian system, which has been implemented in an individualized way.

**Keywords :** ant colony system, genetic algorithms, hydroelectric, hydrothermal systems, optimization, water transfer between rivers

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