

# Multi-period and Multi-objective Optimization of Thermal Energy Conversion Systems for Sustainable Energy Generation

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September 26, 2019

## **Abstract**

Rising global energy demands and rising electricity costs, growing concern about global warming and political commitment to energy security have led to increased interest in research and development of renewable energy technologies. Ocean thermal energy conversion systems (OTEC) represent an attractive economic alternative in communities where a high percentage of electricity production is based on oil. This power generation technology uses the temperature difference between the deep cold water and warm surface water of the ocean to produce electricity using the principles of the Rankine cycle. This talk presents a problem of non-linear programming optimization (NLP), multi-period and multi-objective for the analysis of these systems. The mathematical formulation considers the thermodynamic, economic and exergetic approaches. In addition, the model is composed of non-linear thermodynamic and technical constraints and cost calculations. Finally, maximizing the exergetic efficiency of the cycle and minimizing the total annual cost are considered as objective functions.