

Multi-Objective Optimization in Carbon Abatement Technology Cycles (CAT) and Related Areas: Survey, Developments and Prospects

Authors : Hameed Rukayat Opeyemi, Pericles Pilidis, Pagone Emanuele

Abstract : An infinitesimal increase in performance can have immense reduction in operating and capital expenses in a power generation system. Therefore, constant studies are being carried out to improve both conventional and novel power cycles. Globally, power producers are constantly researching on ways to minimize emission and to collectively downsize the total cost rate of power plants. A substantial spurt of developmental technologies of low carbon cycles have been suggested and studied, however they all have their limitations and financial implication. In the area of carbon abatement in power plants, three major objectives conflict: The cost rate of the plant, Power output and Environmental impact. Since, an increase in one of this parameter directly affects the other. This poses a multi-objective problem. It is paramount to be able to discern the point where improving one objective affects the other. Hence, the need for a Pareto-based optimization algorithm. Pareto-based optimization algorithm helps to find those points where improving one objective influences another objective negatively and stops there. The application of Pareto-based optimization algorithm helps the user/operator/designer make an informed decision. This paper sheds more light on areas that multi-objective optimization has been applied in carbon abatement technologies in the last five years, developments and prospects.

Keywords : gas turbine, low carbon technology, pareto optimal, multi-objective optimization

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020