

Compressor inlet air evaporative cooling effect on the combined cycle gas turbine and solid oxide fuel cell

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Abstract:

In this paper, the first level of a solid oxide fuel cell combined cycle and gas turbines, heat recovery, are considered as the basic cycle. Since heat recovery from exhaust gas turbine to produce injecting steam into the combustion chamber and also increase the cooling system evaporative inlet air to the inlet air compressor and water injection technology is a known to be efficient, to improve the basic cycle to work have been taken. The electrochemical fuel cell modeling and to identify loss voltages within the fuel cell voltage at different working conditions are achieved. The electrochemical analysis, the thermodynamic modeling however elements of the cycle are discussed. The results of modeling show that the benefits of improved cycle by injection of steam and water cycle of the base shows that has increased 18.95 percent compared to the basic cycle. Finally, cycle performance parameters compared to the three major factors: density, fuel cell, pressure, density and mass flow of fuel carried.

keywords: Solid oxide fuel cell , Gas turbine , Combined cycle , Power.