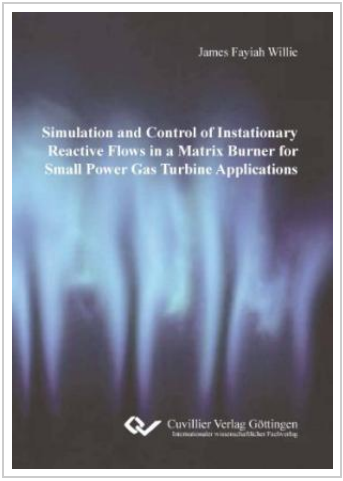

Simulation and Control of Instationary Reactive Flows in Matrix Burner for Small Power Gas Turbine Applications

By James Fayiah Willie

Cuvillier Verlag Feb 2012, 2012. Taschenbuch. Condition: Neu. Neuware - The main objective of this thesis is to analyze combustion instabilities in a matrix burner. The various tools that exist for analyzing thermoacoustic instabilities are applied to the matrix burner with multiple flames. The principal goals are to determine the primary causes of combustion instabilities in the burner and to explore ways of controlling such instabilities in order to prevent damage to the burner. To achieve these goals, the stability map of the burner obtained from measurements is analyzed. This is followed by the analysis of the aerodynamics of the cold flow using CFD. Results obtained from CFD are validated with PIV and LDA results from measurements. Critical are the centerline axial velocity inside the combustion chamber and the recirculation zones on the walls of the combustion chamber and those between the various slots of the matrix burner. Cold flow simulations are followed by reactive flow simulations for both gaseous and liquid fuels. A detailed atomization model is developed for the liquid fuel case from experimental data. Two combustion models, namely, the combined finite rate/eddy dissipation model and the finite rate chemistry model are compared in the CFD simulations of...

Reviews

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