Online Perspectives Journal: Exact & Engineering
Proceedings of the 5th Research & Development PROVIC/PIBIC Seminar
2nd CNPq Scientific Initiation Meeting,
Vol. 10, Nº 29, Supplement, 2020

# Design of an axial-axis gas turbine using computational fluid dynamics software

*Matheus Mattos Pereira*[1], *Silvio Eduardo Teixeira da Silva*[2]

*(1) PIBIC/ISECENSA Scientific Initiation Student – Mechanical Engineering Course; (2) Advisor Researcher – Mechanical Engineering Course - Institutos Superiores de Ensino do CENSA – ISECENSA, Rua Salvador Correa, 139, City Center, Campos dos Goytacazes, RJ, Brazil.*

Due to the high importance of gas turbines in electricity production, it is important to use turbomachinery that correlate dimension, cost and efficiency. The gas turbine is basically comprised by compressor stage, combustion chamber and turbine. The goal of this paper is to dimension the compression stage using computational fluid dynamics analysis as well the use of energy conservation, continuity, and momentum. During the analysis of the compressor, temperature, air pressure, density and transversal section area of the diffuser were measured for each compression stage in the equipment. Energy balances in isentropic conditions were used to describe the air flow process during the gas compression and expansion in the interior of the compressor. After the compressor parameters were defined, the software Ansys/BladeGen was used to model the rotor blades and stator blades. It was observed that to reach the ideal compression rate, the compressor should have at least thirteen stages and the blades must have design variations for each compression stage.

**Keywords:** Energy Electric. Compressor. Simulation.

**Supported by:** PIBIC; ISECENSA.