

## **Flow Simulation inside an Axiale Turbine Stage**

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### **Abstract**

Turbodrill is an axial hydraulic turbines used in drilling hydrocarbons in extreme conditions, possessing advantages over other drilling techniques with their high speed of rotation, and higher operating torques. In the present work, we expose a numerical simulation of a Newtonian Drilling Mud flow, through one stage of this turbine consisted of a stator and a rotor by using finite volumes method with an adapted mesh, and considering K- $\epsilon$  model to take in account turbulence effects. We calculate key performance parameters of our machine, as a function of rotation speed and we will compare them to experimental data of the same model geometry in real operating conditions. Various flow fields are presented such as velocity and pressure, which have great influence on the performance of our present turbine, and that will lead us to choose the best parameters configuration of an optimal field operation.

### **Keywords**

Axial Turbine, CFD, Turbulence, Drilling Mud, CFX, and Turbine Blade.