

# **Mathematical modeling of two-phase flow under Dusty Williamson fluid model**

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## **ABSTRACT**

A physical phenomenon involving two-phase system (fluid and solid) is encountered in many applications like air or water pollution, blood flow in arteries, flows in rocket tubes, sedimentation and fluidized bed. In all of these implementations, the suitable knowledge concerning such system is very essential for predicting the behavior of the flow processes to obtain the expected outcome. Therefore, this paper provides some theoretical assumptions of the possible scenarios occurring in the particular flow system by presenting the mathematical model of two-phase flow. Specifically, the Williamson fluid flow in the presence of dust particles is analyzed with the amalgamate influences of buoyancy force, modified magnetic field and thermal condition of Newtonian heating. The rheology of the respective two-phase flow model is characterized by a set of partial differential equations, which describes its physical properties.

## **KEYWORDS**

Aligned magnetic field; two-phase flow; dusty Williamson fluid

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