

## **Numerical Solution of a Mathematical Model of Vortex Using Projection Method: Applications to Tornado Dynamics**

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**Abstract :** Inadequate understanding of the complex nature of flow features in tornado vortex is a major problem in modelling tornadoes. Tornadoes are violent atmospheric phenomenon that appear all over the world. Modelling tornadoes aim to reduce the loss of the human lives and material damage caused by the tornadoes. Dynamics of tornado is investigated by a numerical technique, the improved version of the projection method. In this paper, authors solve the problem for axisymmetric tornado vortex by the said method that uses a finite difference approach for getting an accurate and stable solution. The conclusions drawn are that large radial inflow velocity occurs near the ground that leads to increase the tangential velocity. The increased velocity phenomenon occurs close to the boundary and absolute maximum wind is obtained near the vortex core. The results validate previous numerical and theoretical models.

**Keywords :** computational fluid dynamics, mathematical model, Navier-Stokes equations, tornado

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