**Weather Pattern Simulation using Numerical Methods**

**Simulation Overview**

The simulation model incorporates basic atmospheric dynamics, including advection, damping, and a sinusoidal temperature variation. It simplifies the complexities of real-world weather phenomena for educational purposes. The model updates the position, velocity, and temperature of a simulated weather pattern over time, offering insights into fundamental atmospheric behaviors.

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Description automatically generatedThe simulation employs numerical integration to update the position, velocity, and temperature at each time step based on the atmospheric dynamics equations.

**Implementation**

The simulation utilizes NumPy for numerical calculations and Matplotlib for visualization. The simulation involves solving differential equations iteratively over time to model the movement of the weather pattern. You can experiment by adjusting parameters like amplitude and frequency to observe different simulated weather patterns.

**Plotting**

The simulation results are visualized using Matplotlib, creating a figure with three subplots arranged vertically:

* Position vs. Time
* Velocity vs. Time
* Temperature vs. Time

Each subplot provides insights into the behavior of the weather pattern over the specified simulation period.