Turbo Mode: Accelerating Combustion Simulations with Machine Learning

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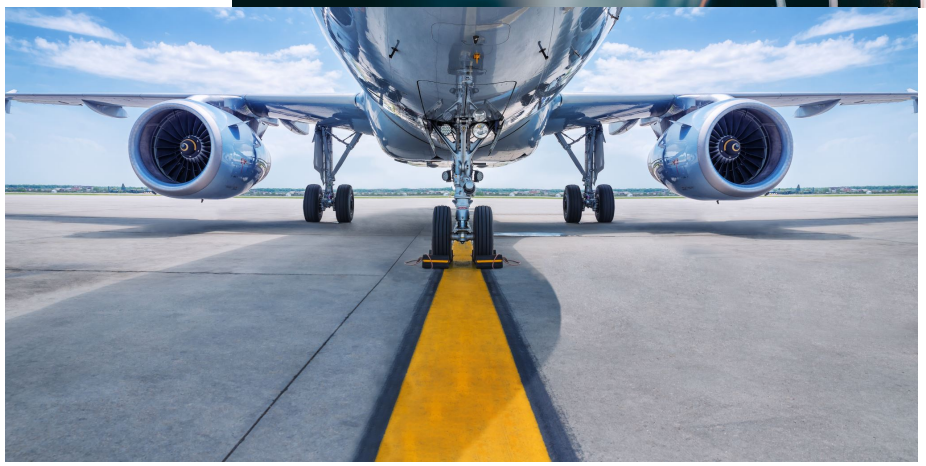
Why Combustion Simulations?

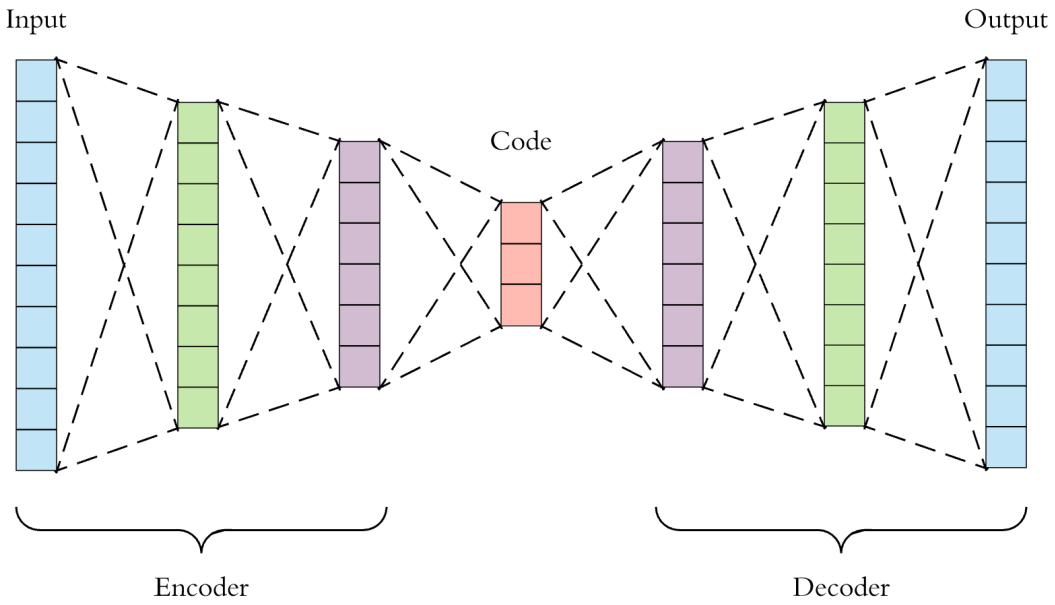
- Transportation still relies on combustion engines
- Fuel efficiency research requires simulation of **complex chemistry** (100's of chemicals)
- **Goal:** reduce simulation cost



Autoencoding Chemical States

Reduce the number of equations using machine learning:

- **In**: chemical concentrations
- **Out:** chemical concentrations
- **Encoded:** lower dimensional representation of chemical state



Training and Results

- Train autoencoder on 1 million combustion examples
- Minimize **mean** error and **total mass** error