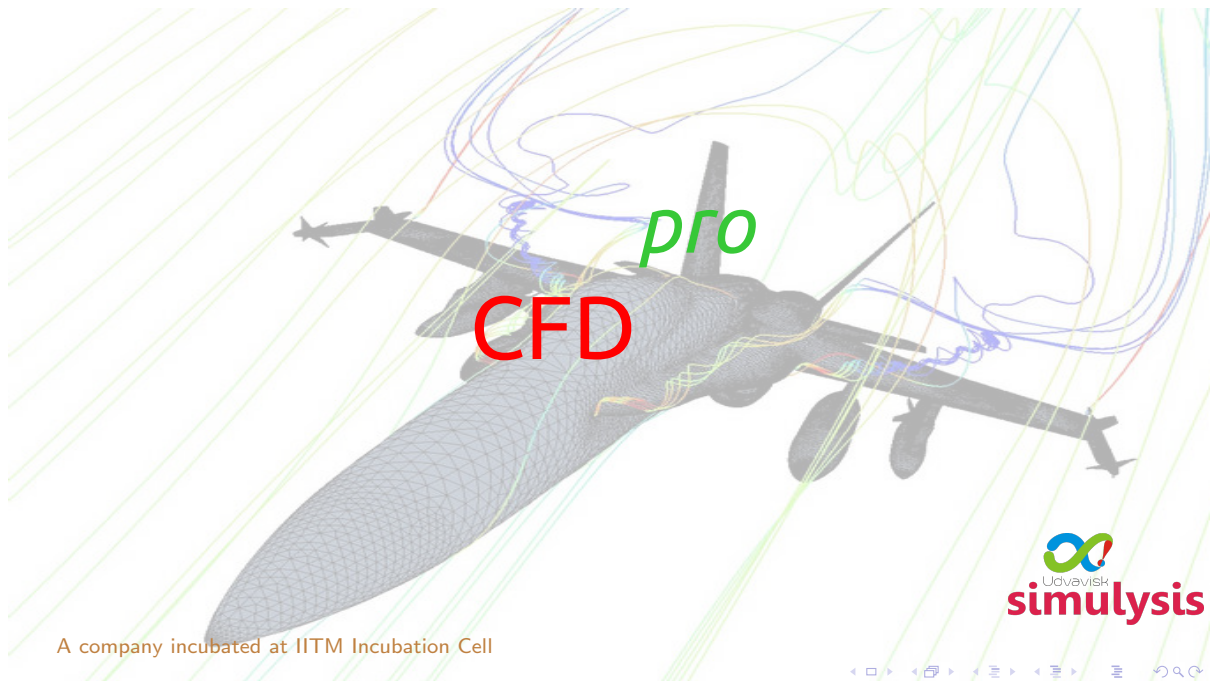


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## Incompressible flow analysis:

Flows with Mach number less than 0.3 are regarded as incompressible flows, as corresponding density variation is negligible. We will be solving both internal and external incompressible flows.

Internal flows:

- Understanding Governing Equation and FEA formulation
- Solution strategy
- Treatment of various terms in transport equation
- Analytical and numerical solutions
- Pressure drop calculation

External flows:

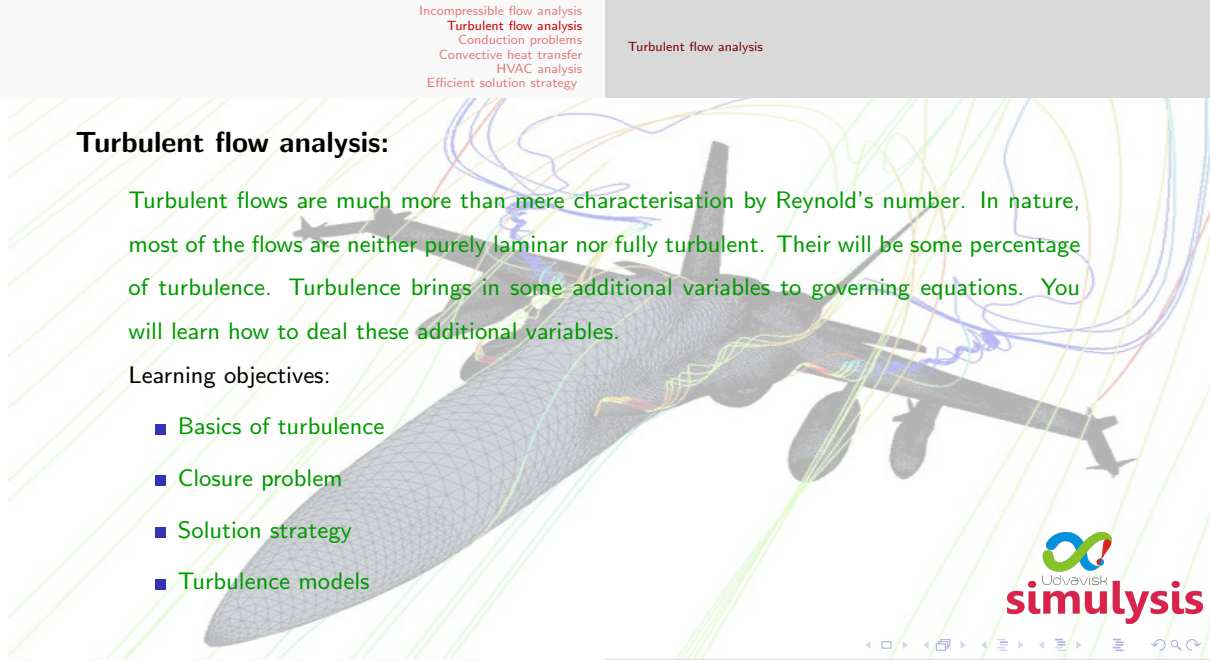
- Capturing boundary layers
- Calculation of drag and lift forces

## Turbulent flow analysis:

Turbulent flows are much more than mere characterisation by Reynold's number. In nature, most of the flows are neither purely laminar nor fully turbulent. Their will be some percentage of turbulence. Turbulence brings in some additional variables to governing equations. You will learn how to deal these additional variables.

Learning objectives:

- Basics of turbulence
- Closure problem
- Solution strategy
- Turbulence models

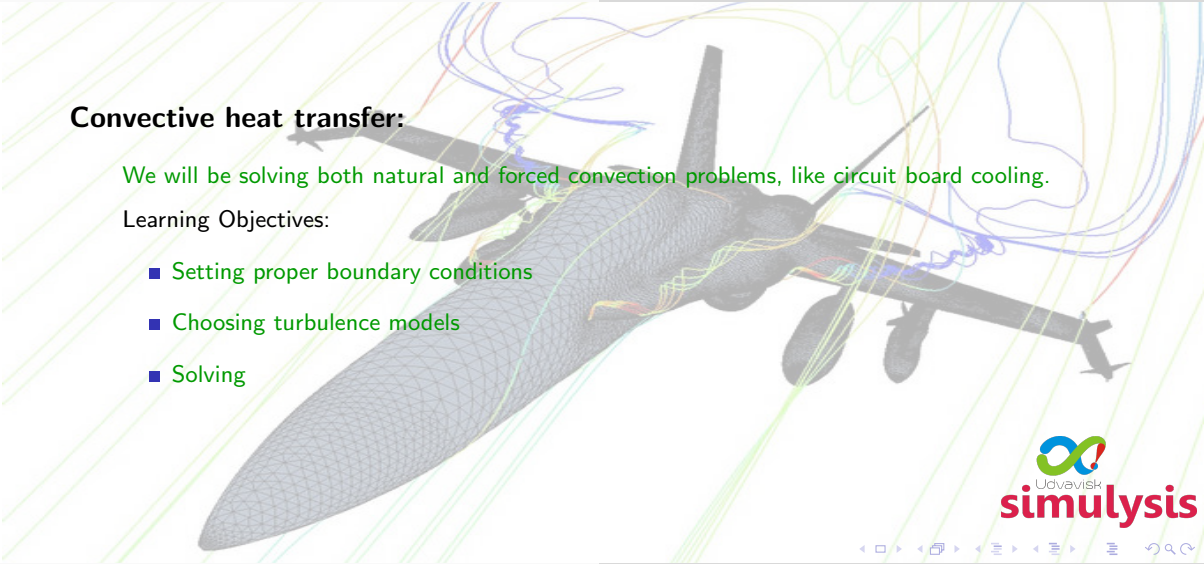


## Conduction problems:

Conduction problem can be steady or transient problems. We will analyse both cases.

Learning objectives:

- Governing equation for heat transfer
- Steady and transient problems
- Solving conduction in FDM
- Finite volume method
- Numerical solution using Octave
- Implicit and explicit methods



## Convective heat transfer:

We will be solving both natural and forced convection problems, like circuit board cooling.

Learning Objectives:

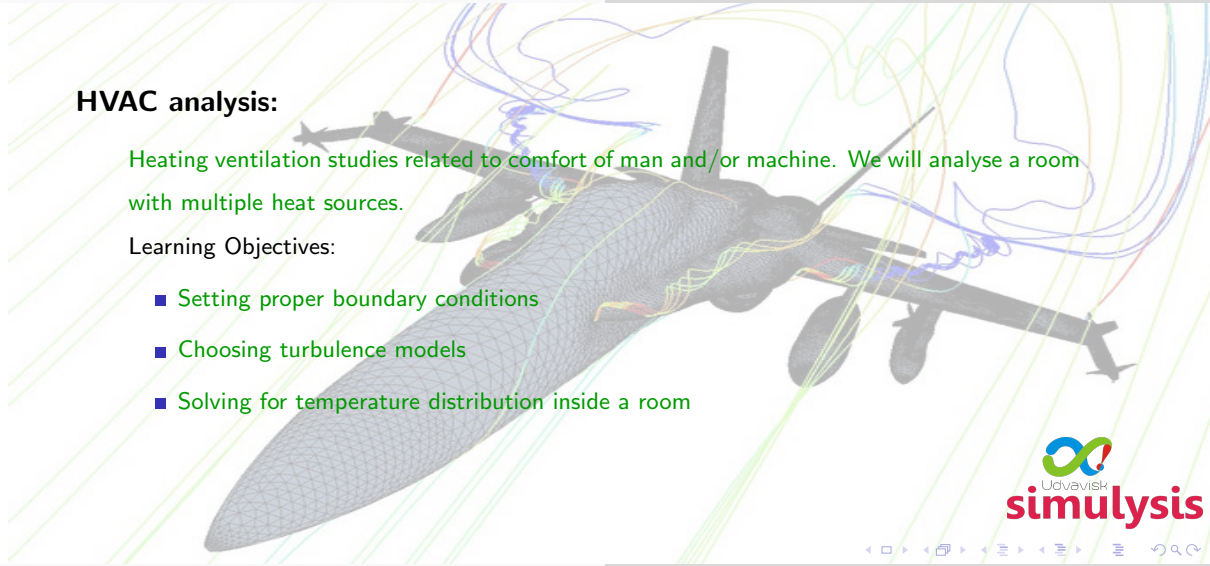
- Setting proper boundary conditions
- Choosing turbulence models
- Solving

## HVAC analysis:

Heating ventilation studies related to comfort of man and/or machine. We will analyse a room with multiple heat sources.

Learning Objectives:

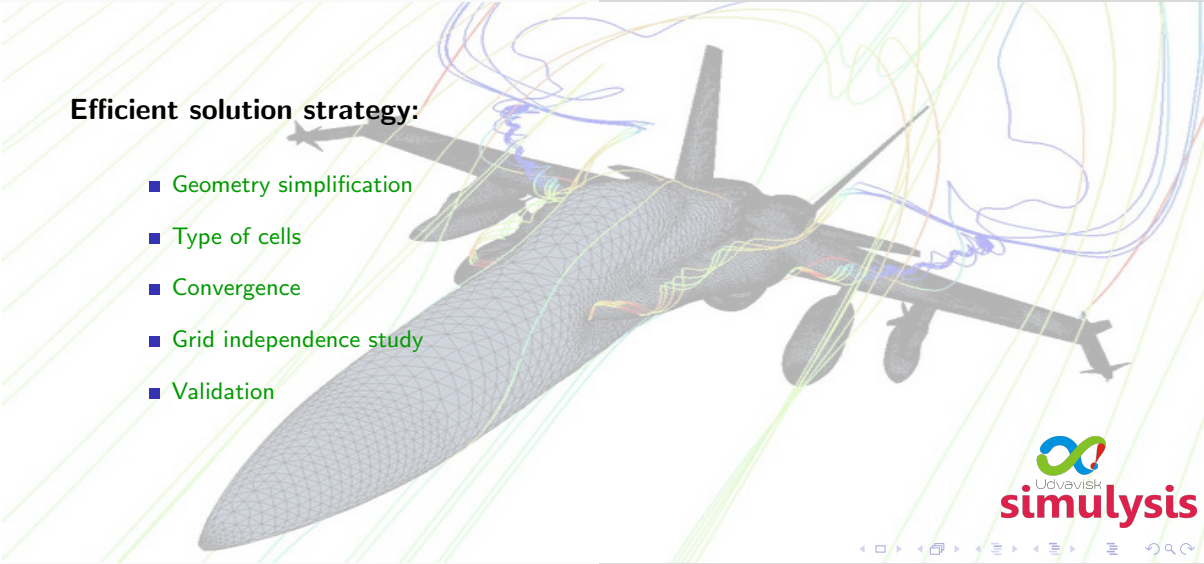
- Setting proper boundary conditions
- Choosing turbulence models
- Solving for temperature distribution inside a room



Efficient solution strategy

## Efficient solution strategy:

- Geometry simplification
- Type of cells
- Convergence
- Grid independence study
- Validation



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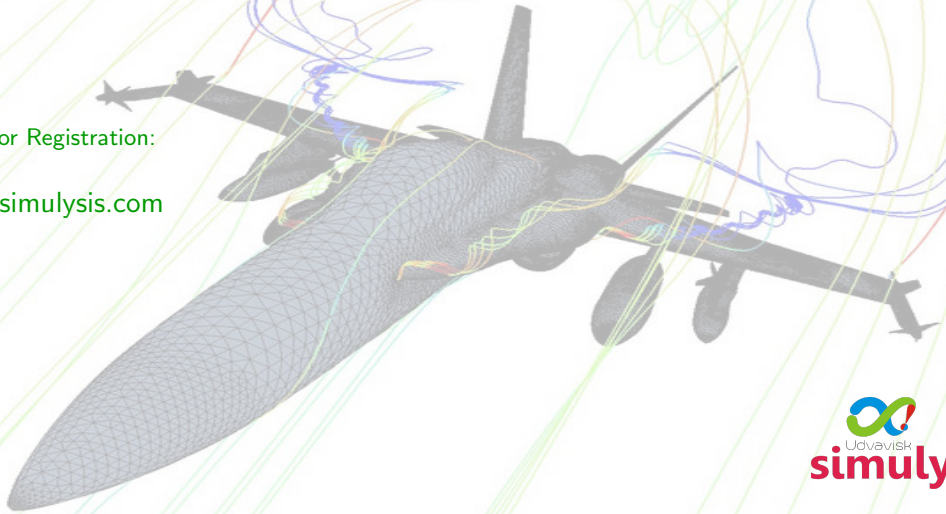

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