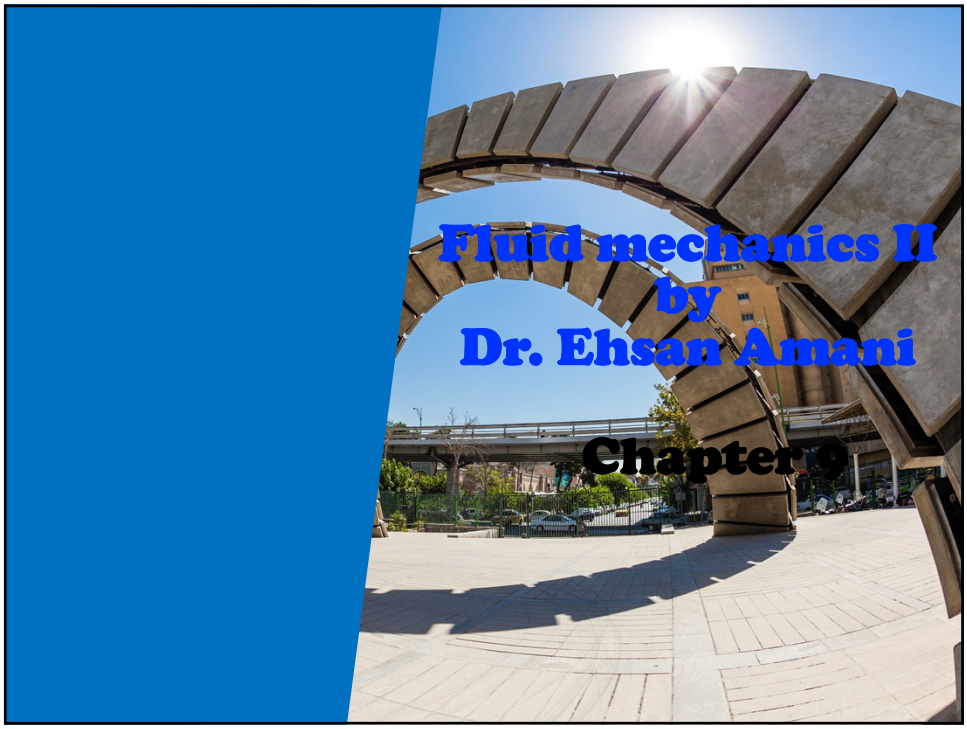
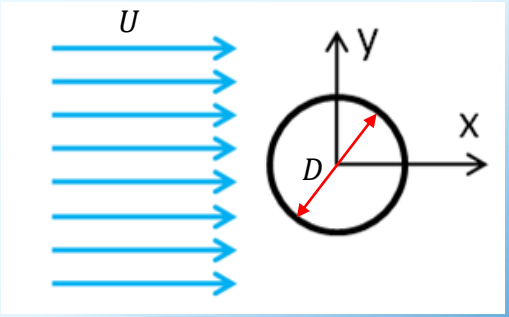


Problem statement

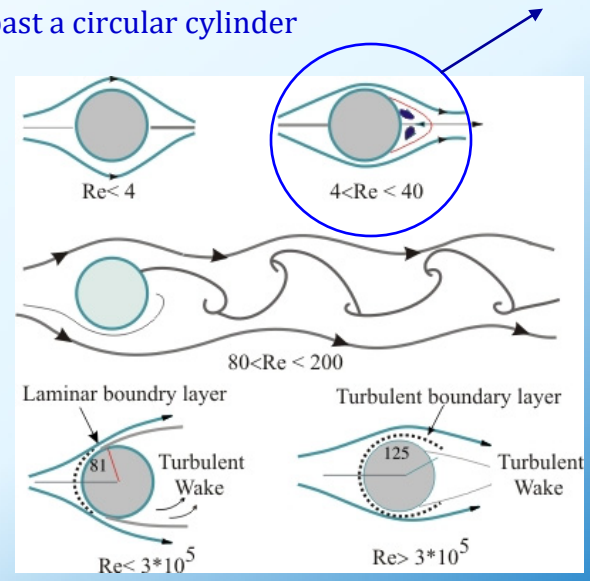
- Flow past a circular cylinder



$$Re_D = \frac{\rho U D}{\mu} = 20$$

Problem statement

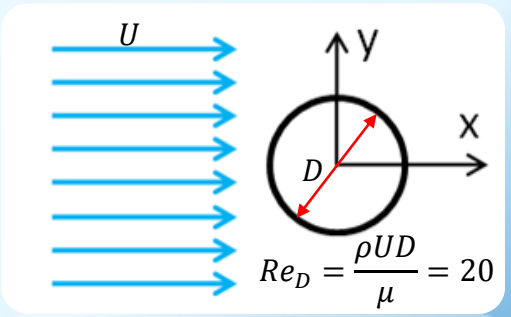
- Flow past a circular cylinder



Chapter 9 By E. Amani

Problem statement

- Flow past a circular cylinder



$U = 1\ m/s$
$D = 1\ m$
$\rho = 1\ kg/m^3$

$$\mu = \frac{\rho UD}{Re_D} = 0.05\frac{kg}{ms}$$

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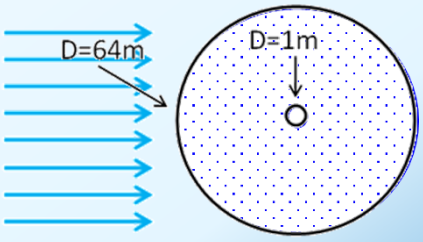
Problem statement

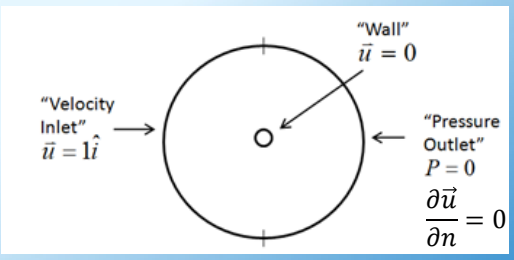
- Governing equations
  - Navier-Stokes (continuity + momentum)
    1. 2D
    2. Steady
  - Boundary conditions
    1. Wall
    2. Far-field

Chapter 9 By E. Amani

Problem statement

- Solution domain and boundary conditions





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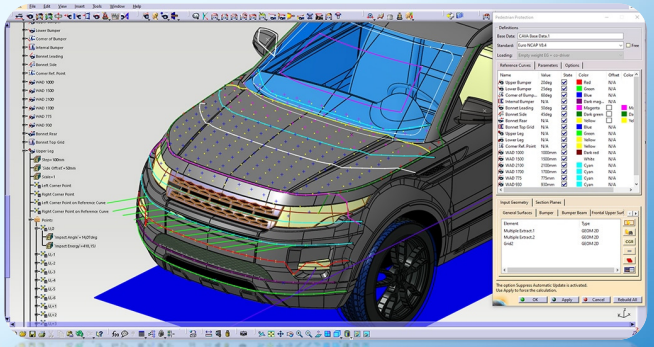
CFD software hierarchical

Geometries (solution domain)

ANSYS Geometry
CATIA



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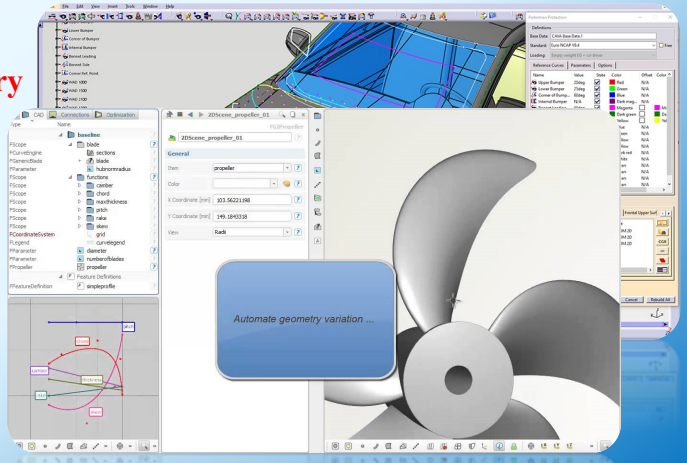
CFD software hierarchical

Geometries (solution domain)

ANSYS Geometry
CATIA
SOLIDWORKS
…

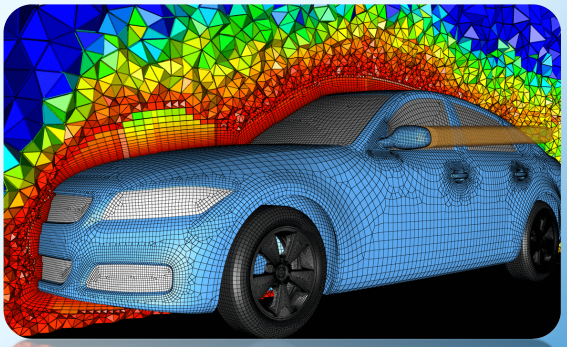


Chapter 9 **By E. Amani**

CFD software hierarchical

Geometries (solution domain) → Mesh (computational grid)

ANSYS Meshing
Pointwise

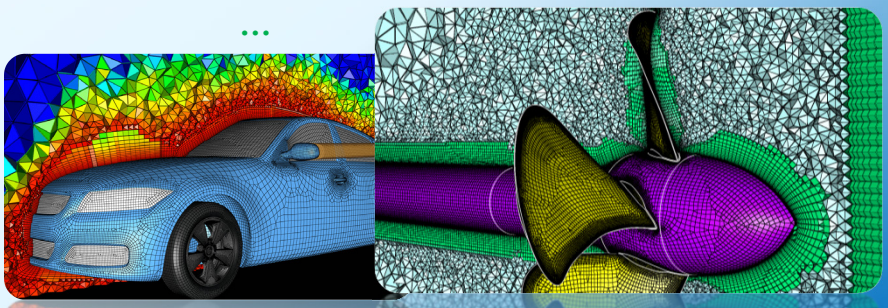


Chapter 9 By E. Amani

CFD software hierarchical

Geometries (solution domain) → Mesh (computational grid)

ANSYS Meshing
Pointwise
ANSYS ICEM
…



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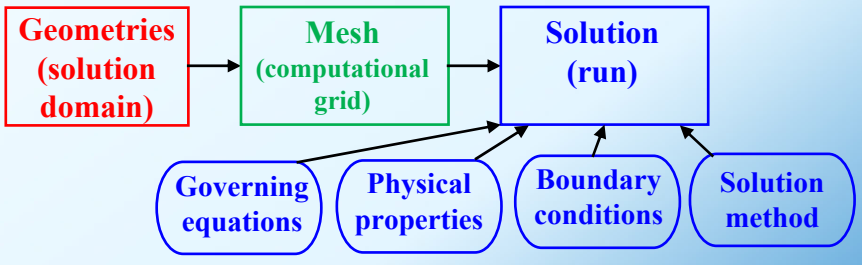
CFD software hierarchical



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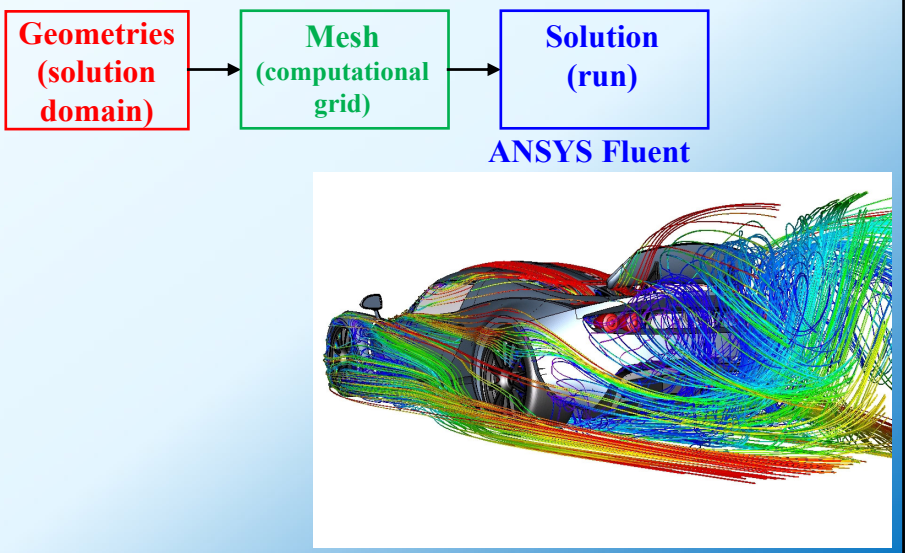
CFD software hierarchical



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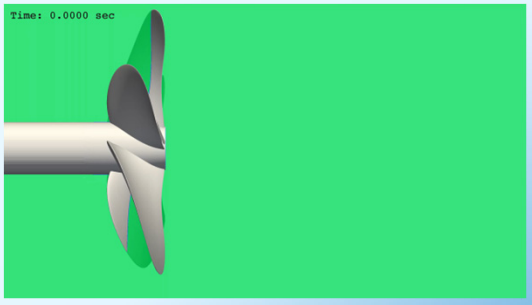
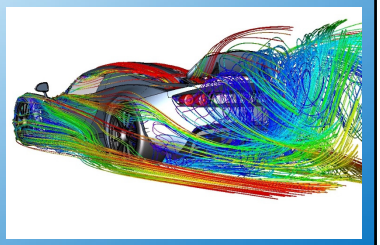
CFD software hierarchical

Geometries (solution domain) → Mesh (computational grid) → Solution (run)

ANSYS Fluent
OpenFOAM
Converge
Star-CCM
…





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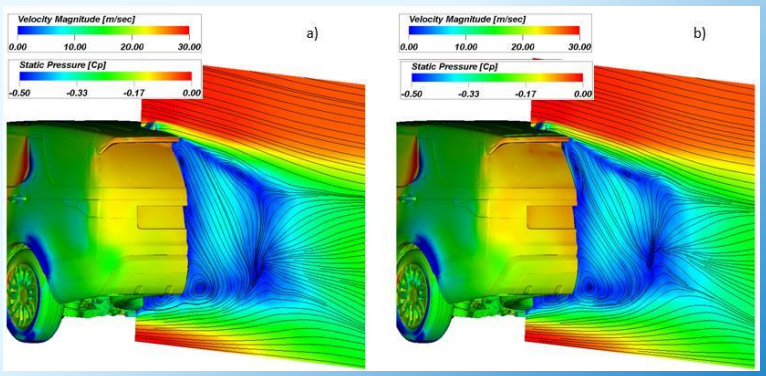
CFD software hierarchical

Geometries (solution domain) → Mesh (computational grid) → Solution (run) → Post-processing

ANSYS CFD-post



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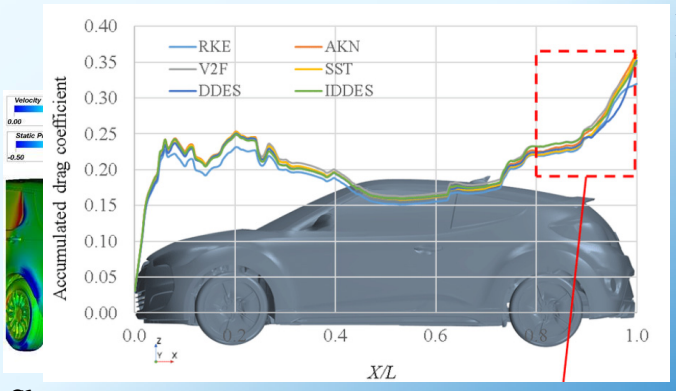
CFD software hierarchical

Geometries (solution domain) → Mesh (computational grid) → Solution (run) → Post-processing

ANSYS CFD-post
Paraview
Tecplot
…



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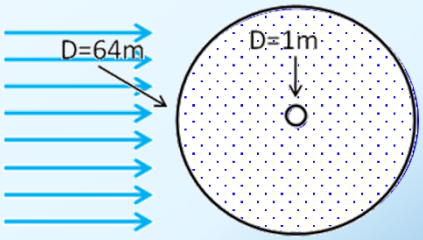
Solution with ANSYS

- Step 1: Geometry



- 3-part video: Cylinder_flow_Geometry#1-3

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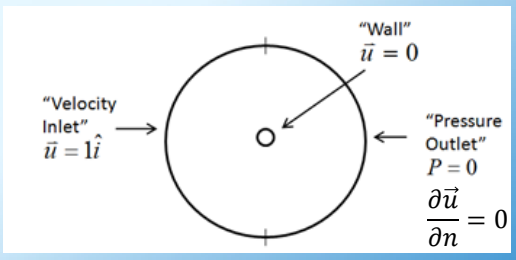
Solution with ANSYS

- Step 1: Geometry
- Step 2 : Mesh
  - 3-part video: Cylinder_Flow_ Mesh#1-3

Solution with ANSYS

- Step 1: Geometry
- Step 2 : Mesh
- Step 3: Solution
  - Model: Navier-Stokes (steady)
  - Boundary conditions



  - Physical properties

$U = 1\ m/s$

$\rho = 1\ kg/m^3$

$\mu = 0.05 \frac{kg}{ms}$

Solution with ANSYS

- Step 1: Geometry
- Step 2 : Mesh
- Step 3: Solution
- Step 4: Post-processing

The end of chapter 9