

FLUENT - 3D Bifurcating Artery (steady)

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Problem Specification

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2. Geometry
3. Mesh
4. Physics Setup
5. Numerical Solution
6. Numerical Results
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3D Bifurcating Artery (steady)

Created using ANSYS 2019R2



This tutorial has videos but no audio.

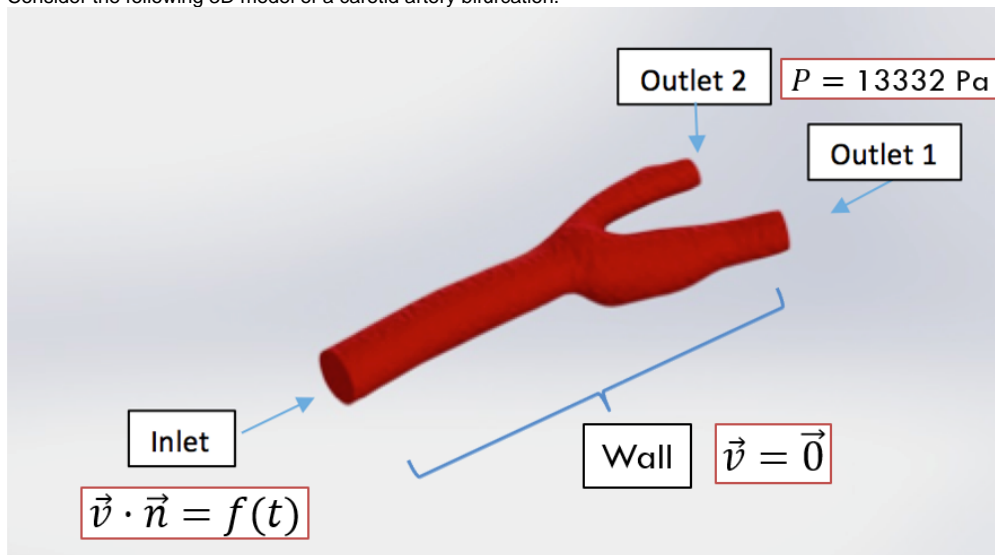
Learning Goals

In this tutorial, you will learn to:

- Create a mesh for a three dimensional internal flow,
- Visualize the flow and compare to expected results

Problem Specification

Consider the following 3D model of a carotid artery bifurcation.



This model is created from a luminal casting of a carotid artery bifurcation and generously shared in Grabcad community

<https://grabcad.com/library/carotid-bifurcation>

Blood flows through the bifurcating artery from the inlet (to the left in the graph above) and exits from the two outlets (to the right). The diameter of the artery at the inlet is around 6.3mm. The diameter of Outlet 1 is around 4.5mm and the diameter of Outlet 2 is around 3.0mm. The density of blood is 1060 kg/m³ [1]. Blood is a non-Newtonian fluid, meaning the coefficient of viscosity of blood is not a constant, but is a function of velocity gradients. This only has approximately a 10% effect on the results, and so for simplicity we will model the fluid with a constant viscosity here. We will also ignore the pulsatile and cyclic nature of blood flow, as the problem would become transient. If you are interested in modelling these effects, please see the [3D Bifurcating Artery \(unsteady\)](#) tutorial. The pressure at the outlet is defined to be constant (100 mmHg). More details on boundary conditions will be provided in the next page Pre-Analysis and Set-up.

Handout:

- [ANSYS Fluent solution outline](#)

[Go to Step 1: Pre-Analysis & Start-Up](#)

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