Study of Taylor Couette flow

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Abstract

The objective of the present project is to study the Taylor Couette flow between two cylinders in open source CFD package openFOAM. The velocity profile between the cylinders and wall shear stress are obtained and compared with the analytical results. Separate case studies with laminar and with turbulence properties are studied and graphs are plotted. The geometry and mesh was created using 'blockMesh' utility. This is a 2D case with dynamic viscosity is 0.1 Pa.s and density 1 Kg/m^3.
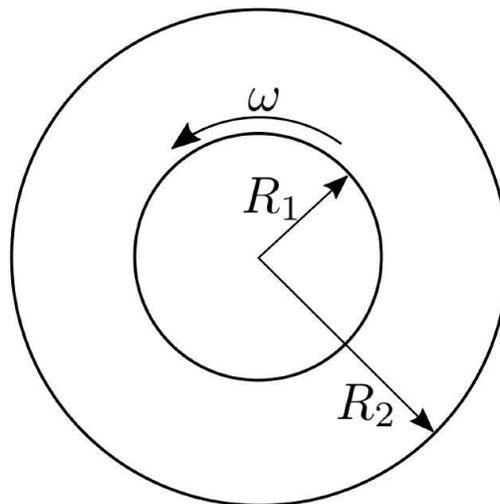
Figure 1: Schematic drawing of the Taylor Couette Flow.
(R_1 = 1 m, R_2 = 2 m and ω = 6 rad/s)

References

[1] Taylor, Geoffrey I., Stability of a Viscous Liquid Contained between Two Rotating Cylinders. VIII. *Philosophical Transactions of the Royal Society A*, (1923), 23, 289-343. (https://doi.org/10.1098/rsta.1923.0008)