**Pressure and Drag-Driven Flow Between Two Infinite Parallel Flat Plates**

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# Nomenclature

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| --- | --- |
|  | Velocity profile as a function of y |
|  | Velocity at |
|  | Velocity at |
|  | Viscosity of a Newtonian fluid |
|  | Density of an incompressible fluid |
|  | Constant pressure gradient |

# 1 Objective

# 2 Flowchart

# 3 Results

Pressure-driven flow of an incompressible, Newtonian fluid can be described through the Navier-Stokes equation (1).

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Additionally, the flow was assumed to be steady, dominated by viscous forces (i.e. negligible convection), one-directional along the x-axis, and fully developed. With these additional assumptions imposed, the equation of motion in the x-direction reduces to equation (2).

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Although this system can be solved analytically, the finite difference computational method was implemented.

The no-slip condition of fluid motion presents two Dirichlet boundary conditions: the fluid moves at velocity and at the lower and upper plate, respectively.

Through central difference analysis, the second derivative of velocity can be written as follows:

Where is the step size between points .

* Sub into equation (2)
* For n points or smth

For :

Where is a known boundary condition.

For :

Where is a boundary condition.

For :

# 4 Discussion

# 5 Conclusion