Project Report

Computational Fluid Dynamics

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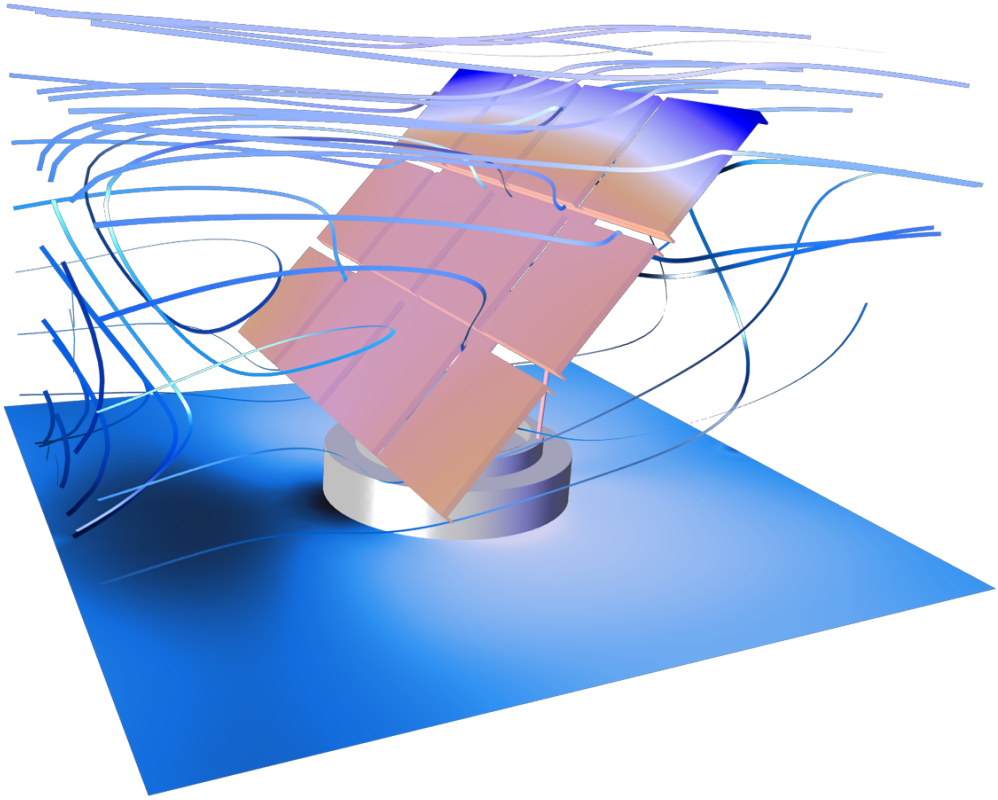

1 Introduction :

This is a brief report on our project work for the given problem statement in Computational Fluid Dynamics

1.1 Aims and Objectives

- To find the solution for the given equation in the form $C(t, x)$ with the given initial condition and boundary condition.
- To find how the variable D influence the final result
- To plot the graphs which represent the evolution of $C(t, x)$ with variation in time

2 About Equation :

The given equation is

$$\frac{\partial C}{\partial t} = D\left(\frac{\partial^2 C}{\partial x^2}\right)$$

- The given equation is time marching problem, since if a disturbance is created in the concentration at a instant it can only influence the subsequent time but it can't affect the preceding time. So time is one way coordinate system
- Time marching problem have discontinuity at one point i.e. where the disturbance is created or the reference initial condition.
- Parabolic in time. When the disturbance is created at t_0 it affects the entire system for $t > t_0$ but not for $t < t_0$.
- Elliptic in space. After the disturbance, at $t \to \infty$ the system attains a steady state then the concentration C is no more a function of time. So the equation becomes D times just double differential of x