AE 625 -Particle Methods in Fluid Flow Simulation
Assignment 7: Report
Viscous Flow around a Cylinder

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Evolution of vortices around Cylinder
$Re = 1000$
$Radius = 1.0$
$NumberofPanels = 30$
$delta\_t = 0.1sec$
$FreeStreamVelocity = 1.0$

1 Vortex Dstibution Around Cylinder with time for a viscous Flow

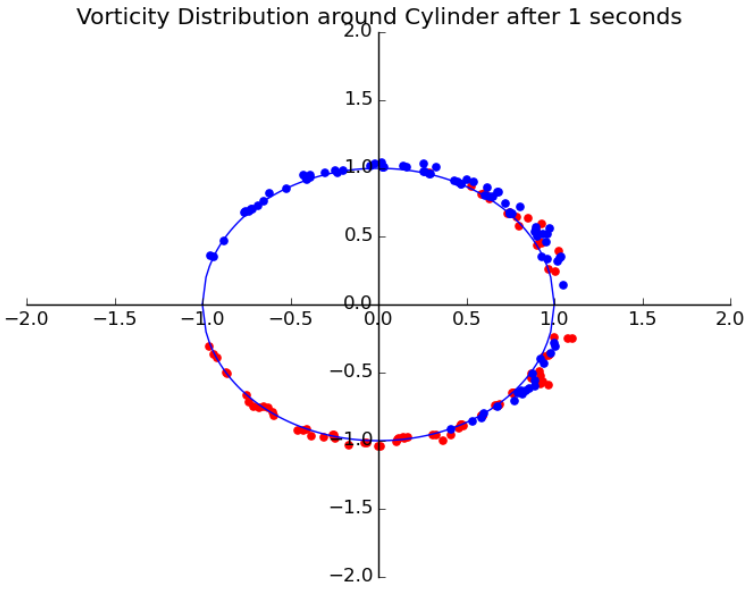

Figure 1: Vortices around the cylinder at time = 1 sec

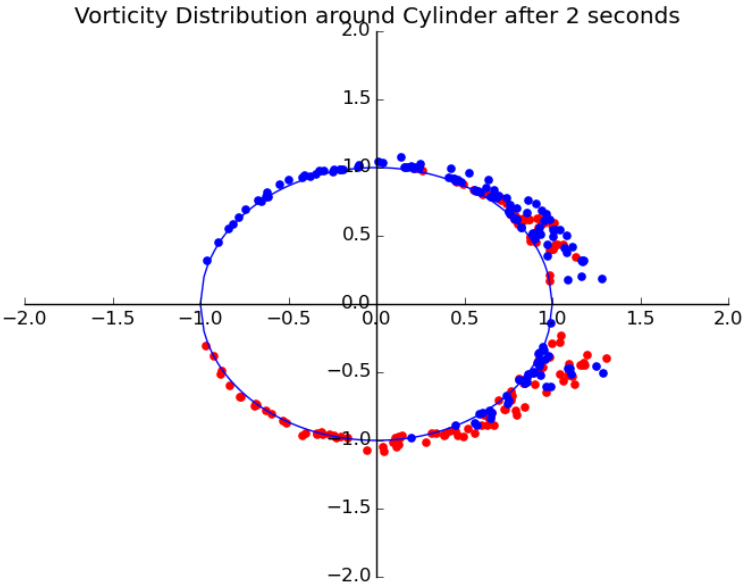

Figure 2: Vortices around the cylinder at time = 2 sec

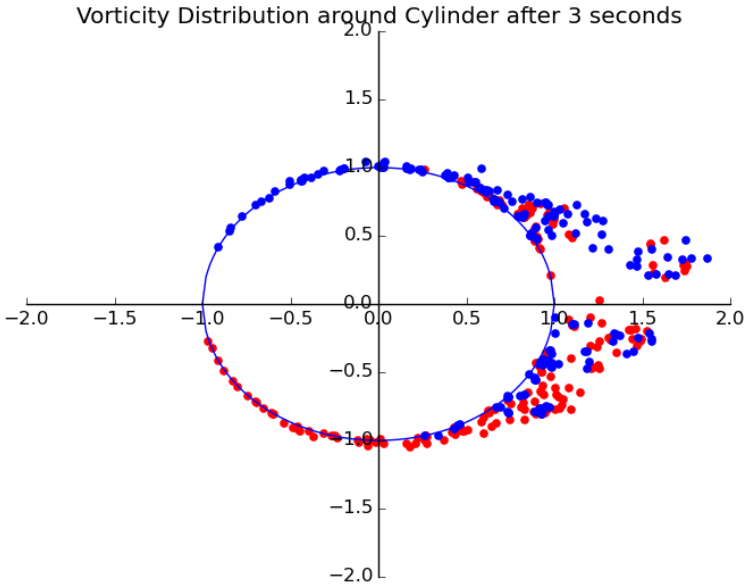

Figure 3: Vortices around the cylinder at time = 3 sec

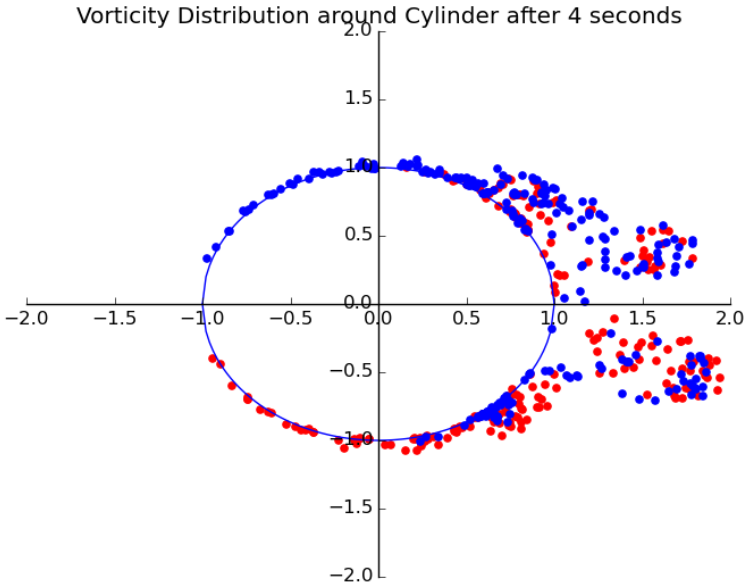

Figure 4: Vortices around the cylinder at time = 4 sec

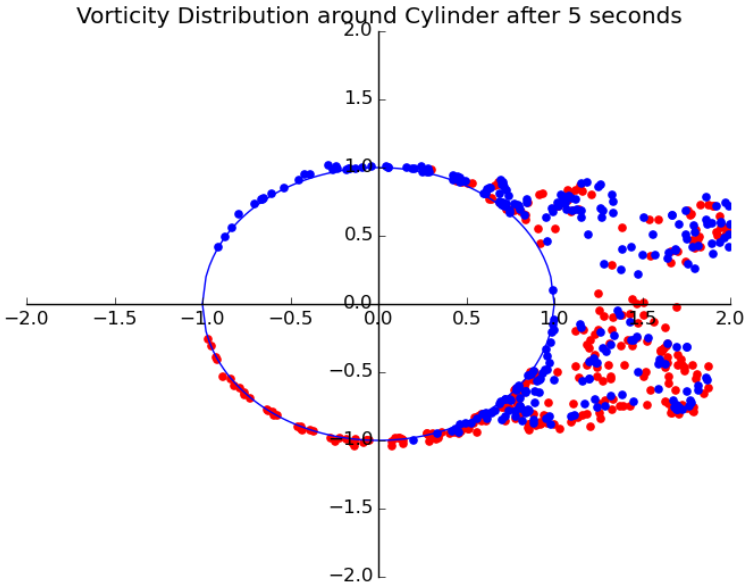

Figure 5: Vortices around the cylinder at time = 5 sec

2 Velocity Distribution for Viscous flow around a Cylinder

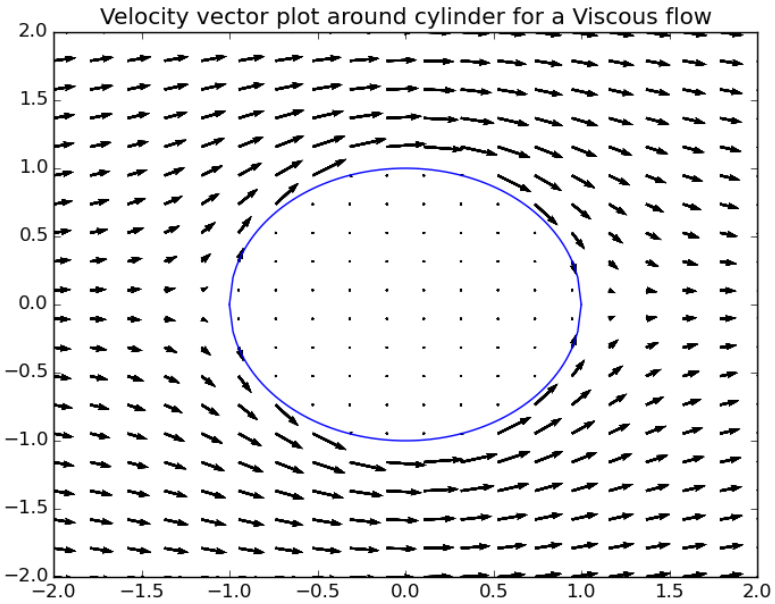

Figure 6: Velocity Distribution around Cylinder at 0 sec

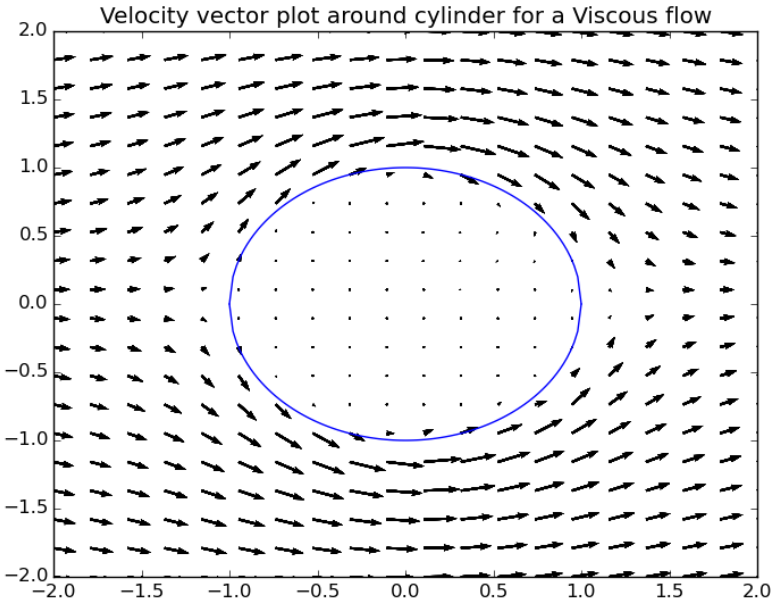

Figure 7: Velocity Distribution around Cylinder after 1 sec

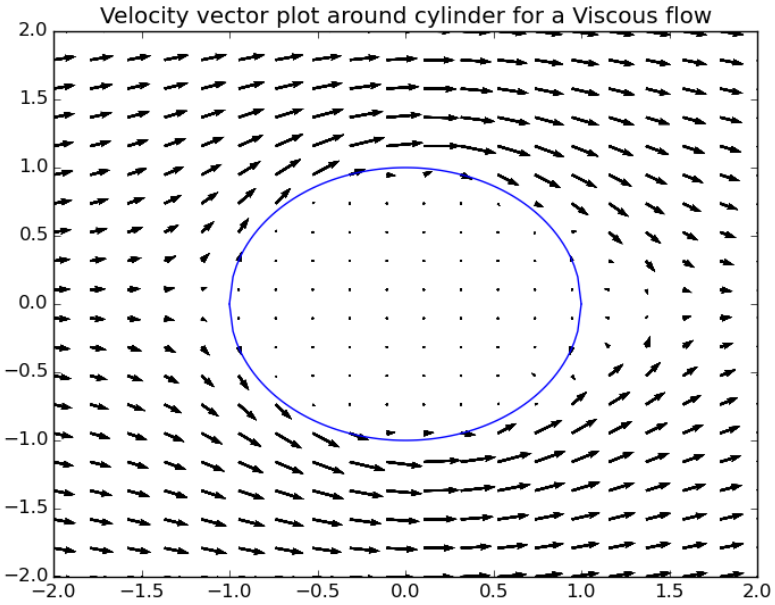

Figure 8: Velocity Distribution around Cylinder after 2 sec

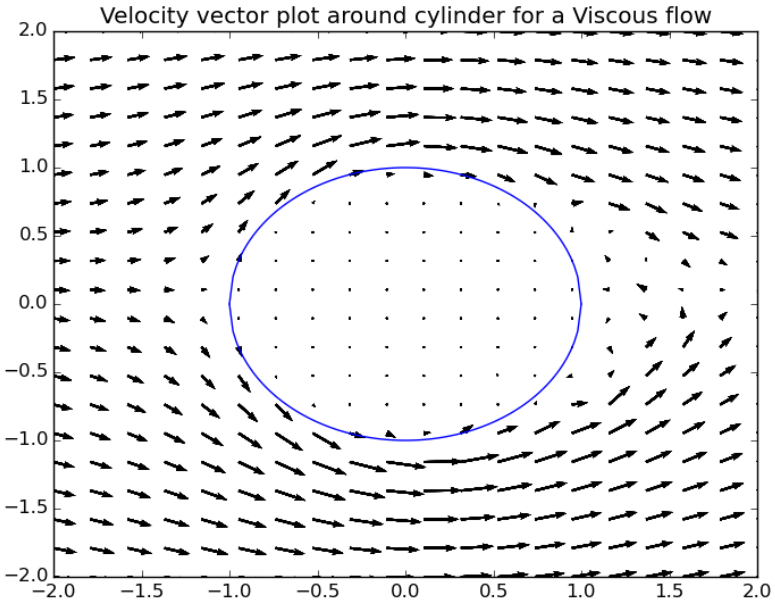

Figure 9: Velocity Distribution around Cylinder after 3 sec

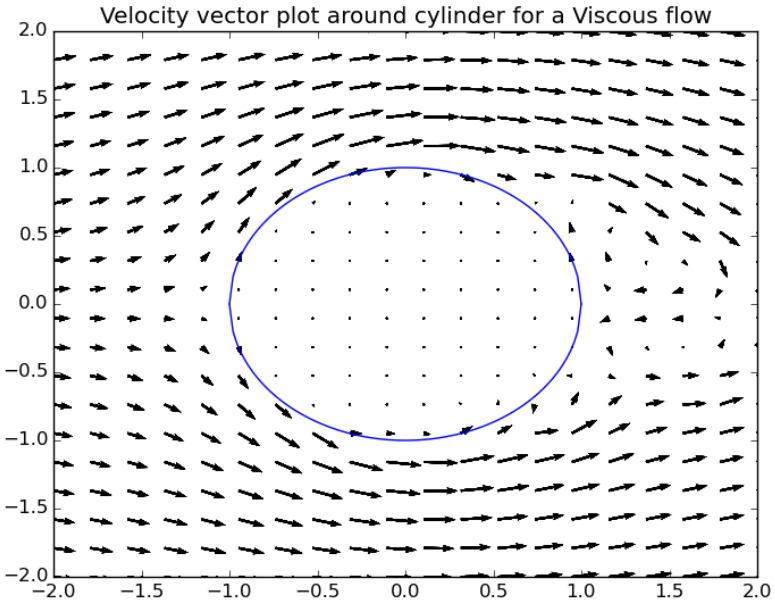

Figure 10: Velocity Distribution around Cylinder after 4 sec

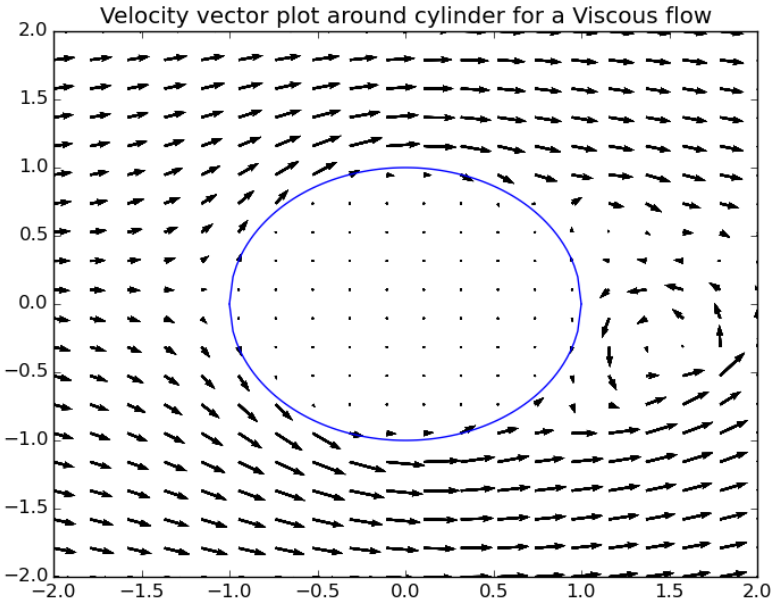

Figure 11: Velocity Distribution around Cylinder after 5 sec

3 Close View to the Separated Region

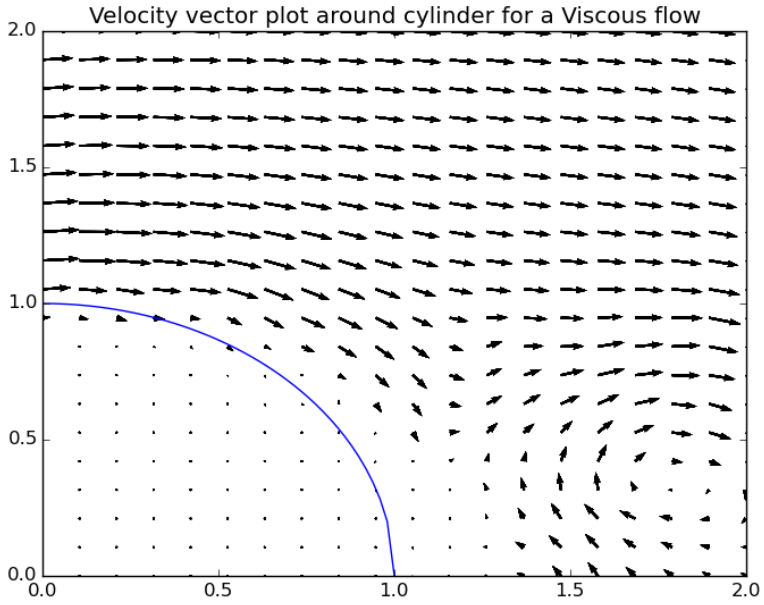

Figure 12: Separated Region at time = 5 sec

4 Variation of Drag Coefficient with time

(Smoothed with Moving average of Period 3)

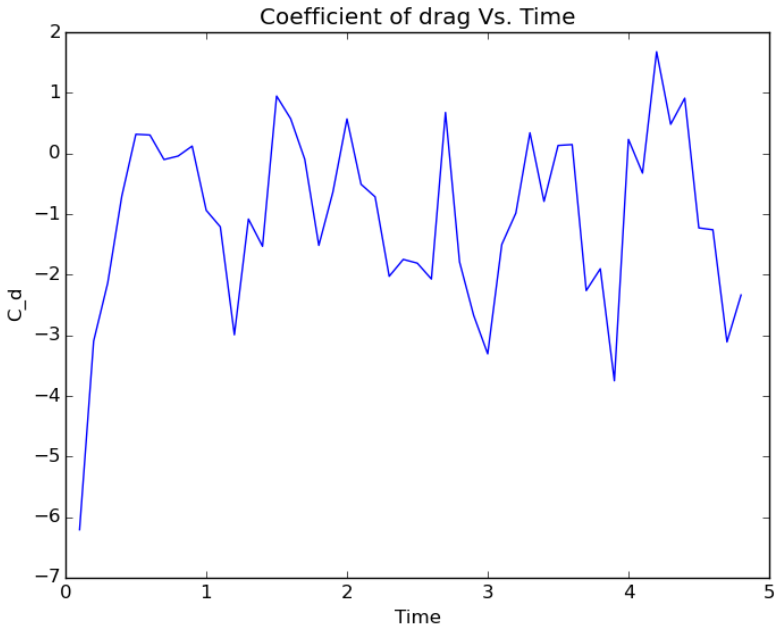

Figure 13: Drag Coefficient vs. time