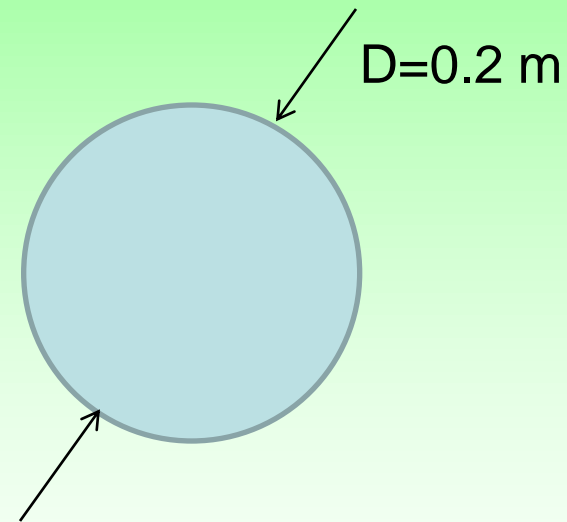
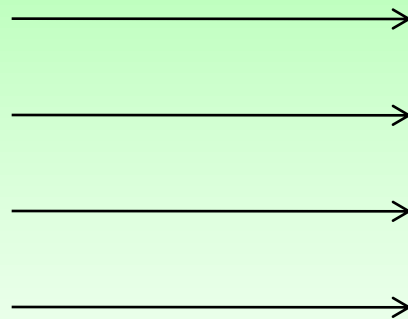


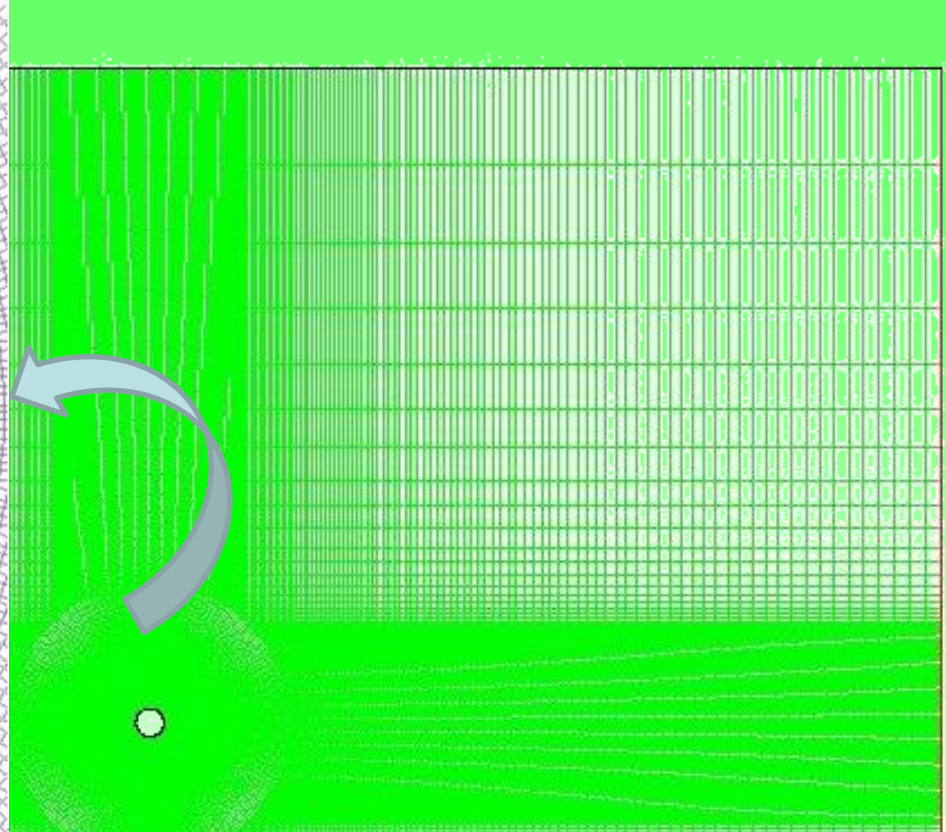
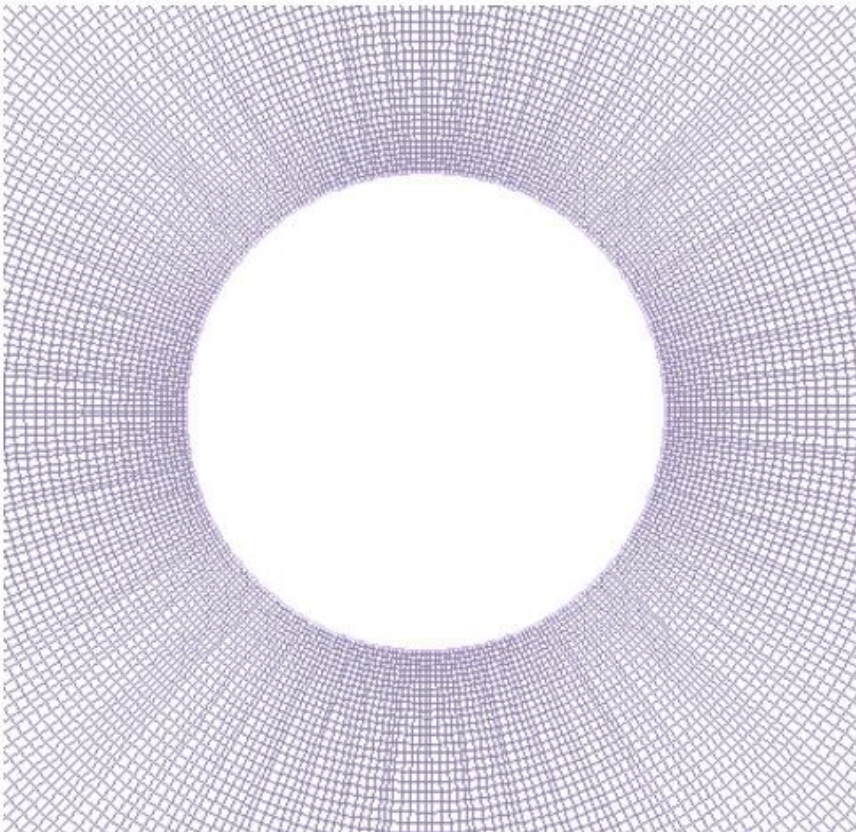
Prediction of Vortex Shedding downstream of cylinder via ANSYS/Fluent

Uniform inflow past a circular cylinder

Uniform Velocity: $U=1$ m/sec



Reynolds Number: $Re=200$ ($\nu=10^{-3}$ m²/sec)

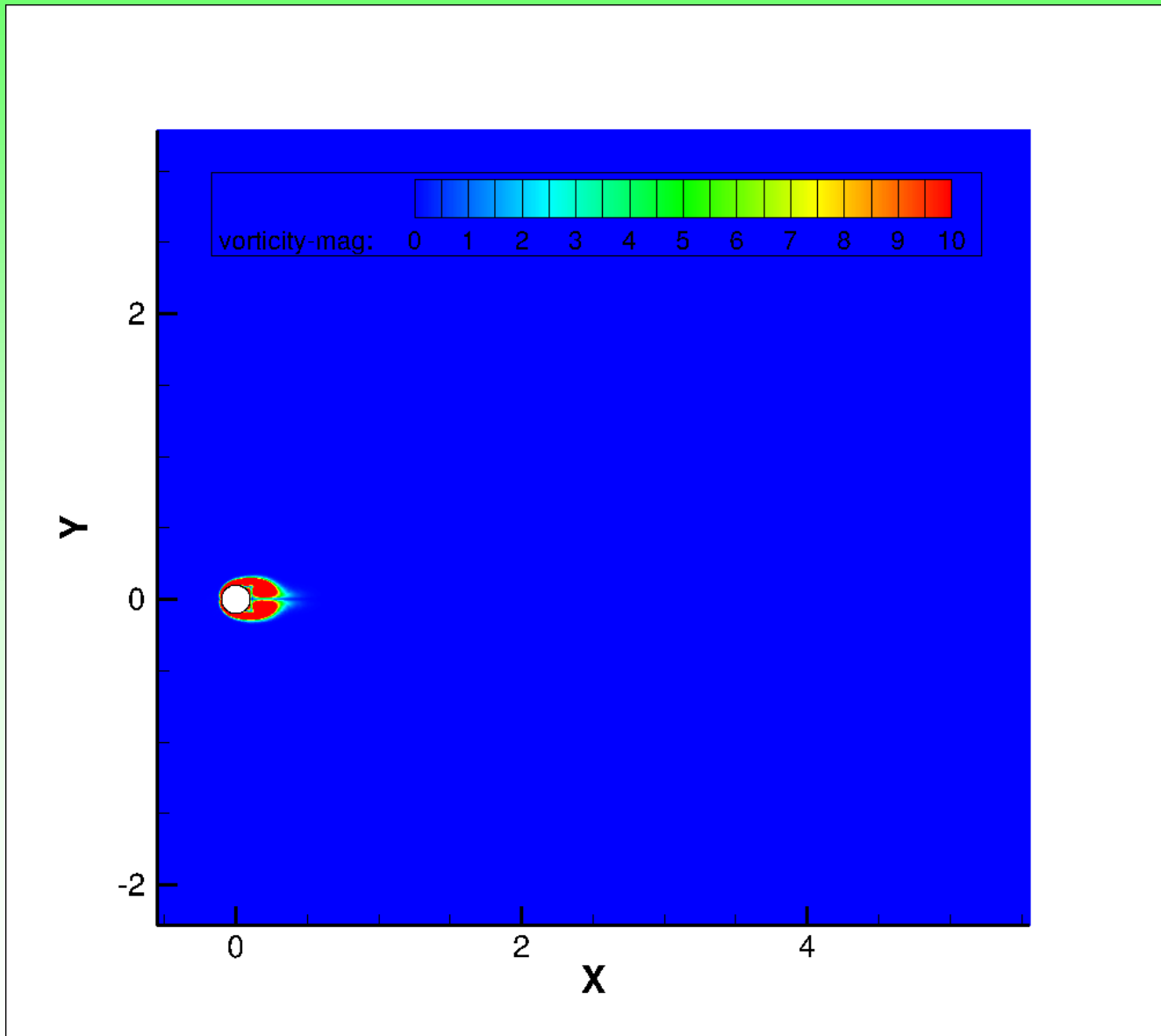


Grid close to the cylinder

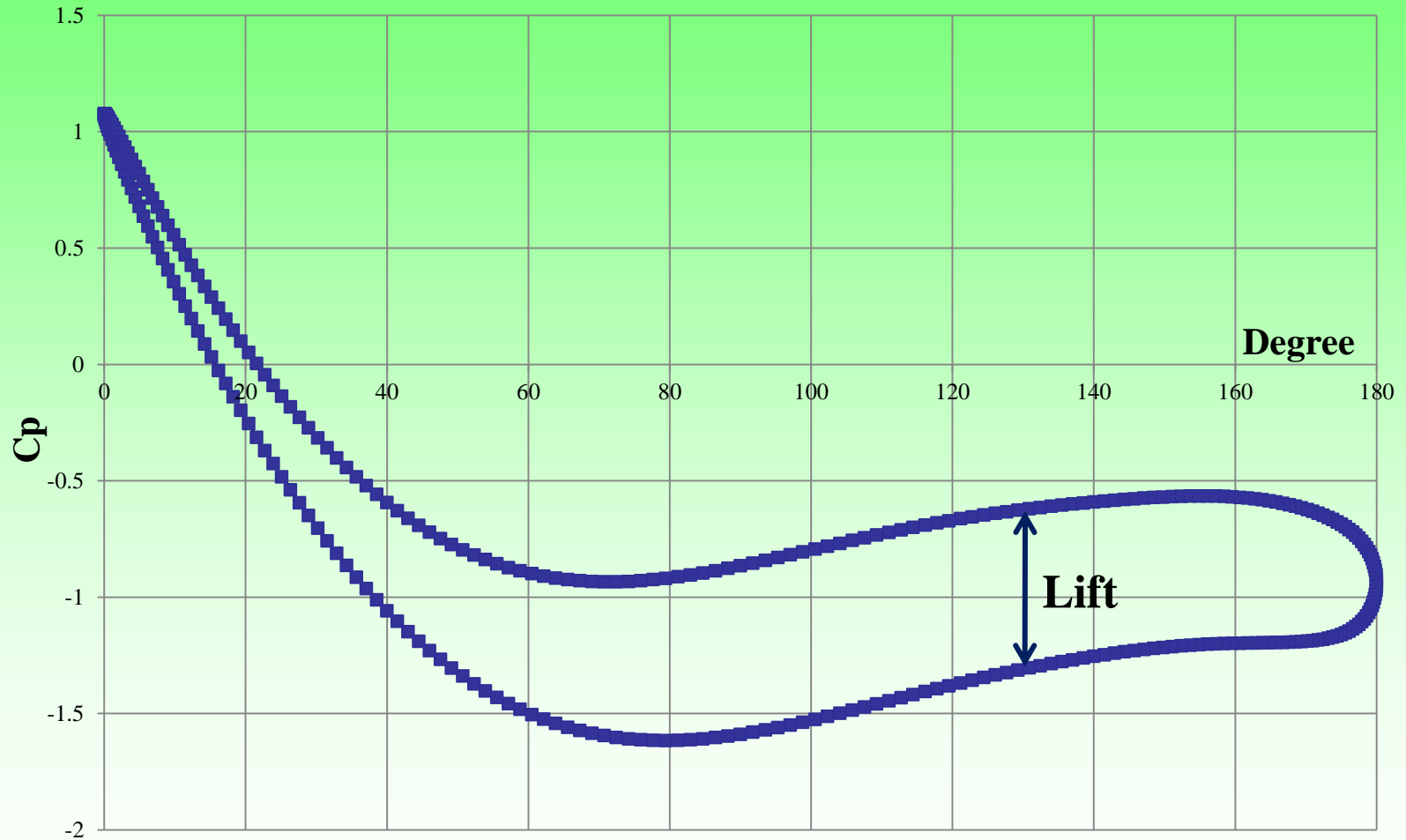
56800 Cells
CPU time: 6 hrs
No. of CPUs: 4

Predicted vorticity patterns ([von Karman street](#)) with time

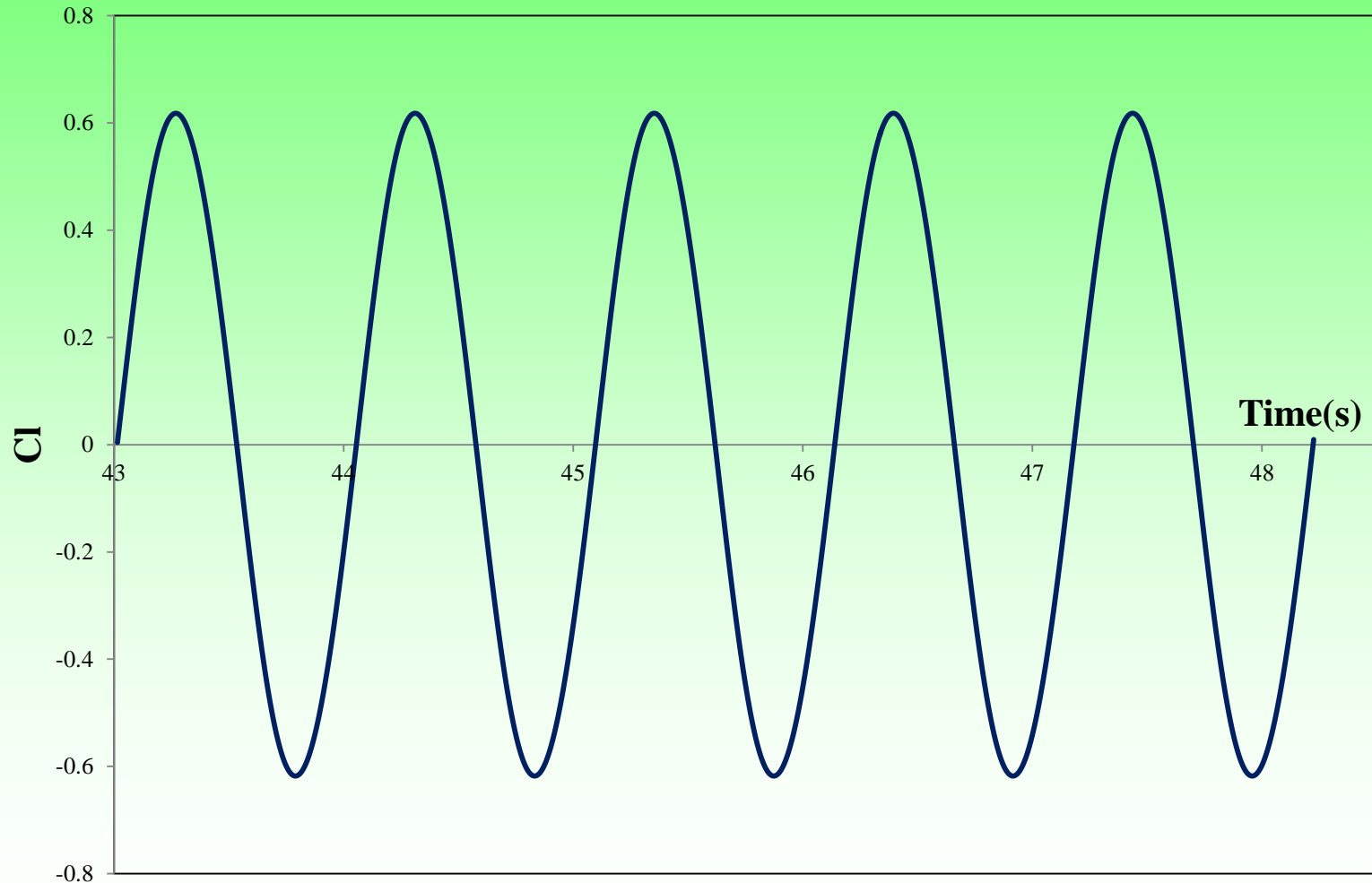
Note: Initially flow is symmetric w.r.t. horizontal axis



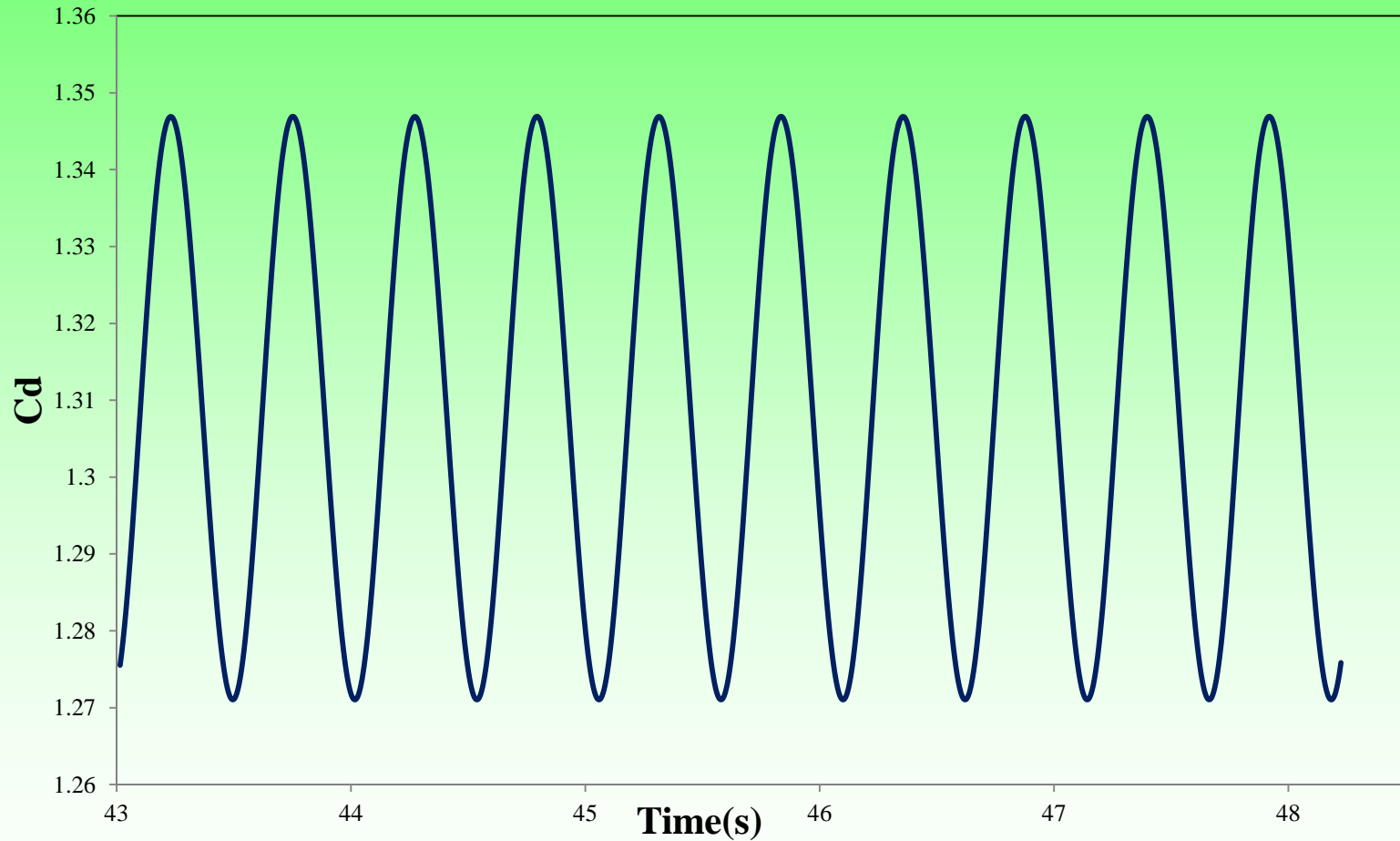
Pressure coefficient over the top and bottom sides of the cylinder



Lift Coefficient: alternating lift causes **VIV (Vortex Induced Vibrations)**



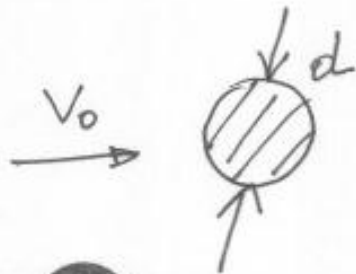
Drag Coefficient: Period of drag variations is half of that of the lift (can you explain that?)



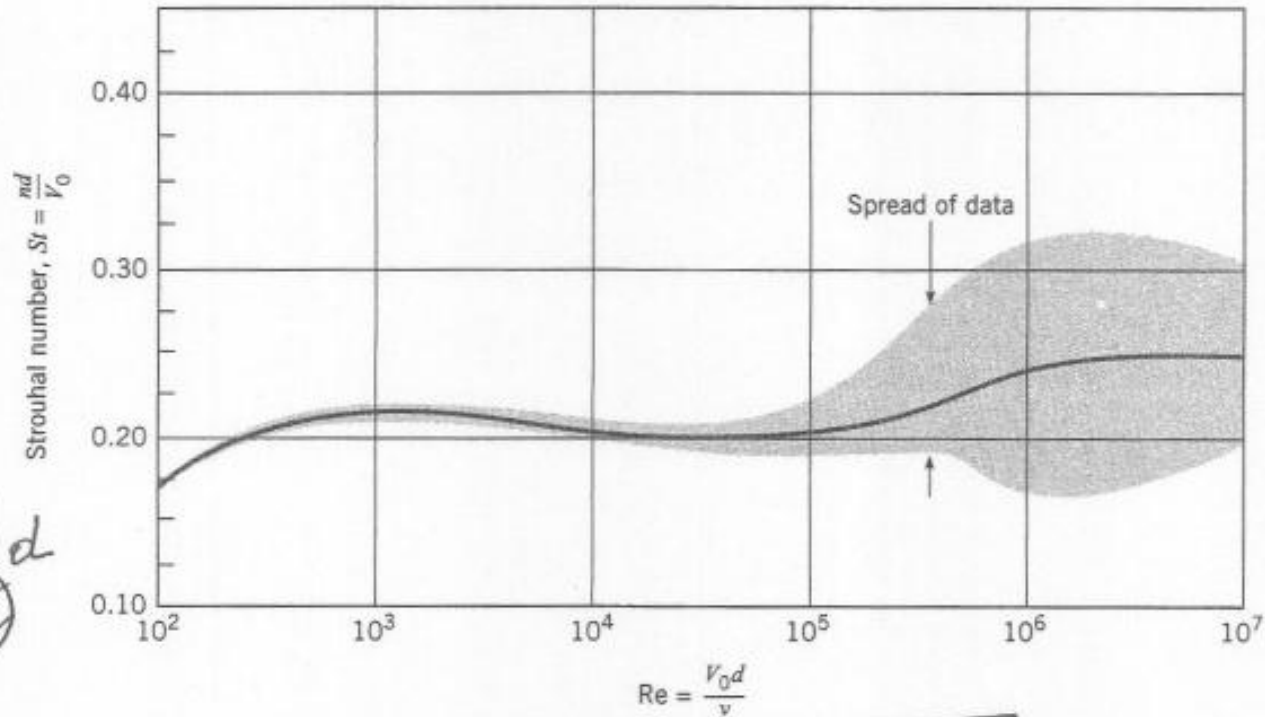
What is the frequency of shedding n (cycles/sec)? (graph taken from Crowe's book)

FIG 11.10

Strouhal number versus Reynolds number for flow past a circular cylinder. [After Jones (17) and Roshko (27)]



Effect of Streamlining



$$\text{Strouhal } No = \frac{n \cdot d}{V_0}$$

(St)

VIV can be reduced with the use of fairings (on risers) or helical strakes (from vivsolutions.com)



Strakes reduce VIV on chimney stacks, car antennas, or spar offshore platforms (see next page)



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