Adalberto Campos

Dr. HP – MAE 494

November 18, 2016

Challenge #5 (pool = 80 points, cap = 4 points) [No collaboration]

a) Use the setting of Task 1(a) as the starting point.

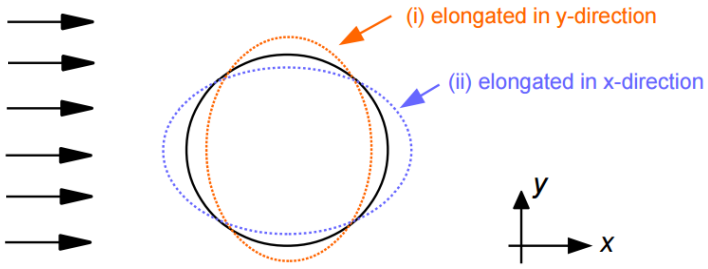

Figure 1: Setup of elongated cylinders.

Table 1: Amplitude and Oscillation

Object shape	Amplitude	Period of oscillation
Circle	0.00368	2.49 minutes
Ellipse (i) [elongated in y]	0.00843	2.71 minutes
Ellipse (ii) [elongated in x]	0.00161	2.15 minutes

Ellipse radii was set to 0.08m & 0.125m to maintain equal body area to the 0.10m radius circle.

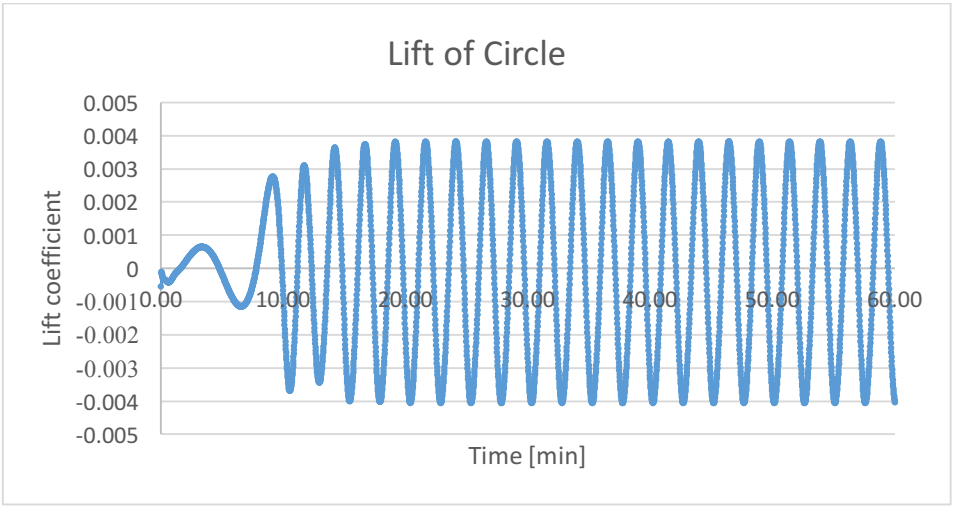

Figure 2: Lift of circular object

(b) Repeat (a), but now change the circular cylinder to an elliptical cylinder with approximately the same body area. Consider the two cases: (i) A cylinder elongated in y-direction, (ii) A cylinder elongated in x-direction.

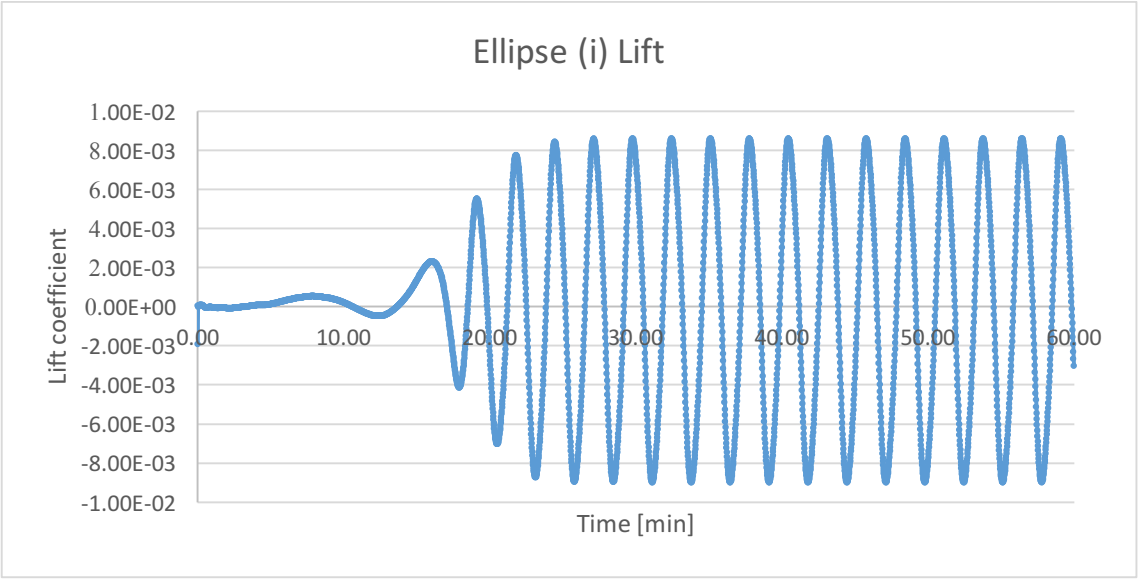

Figure 3: Lift of ellipse elongated in the y-direction.

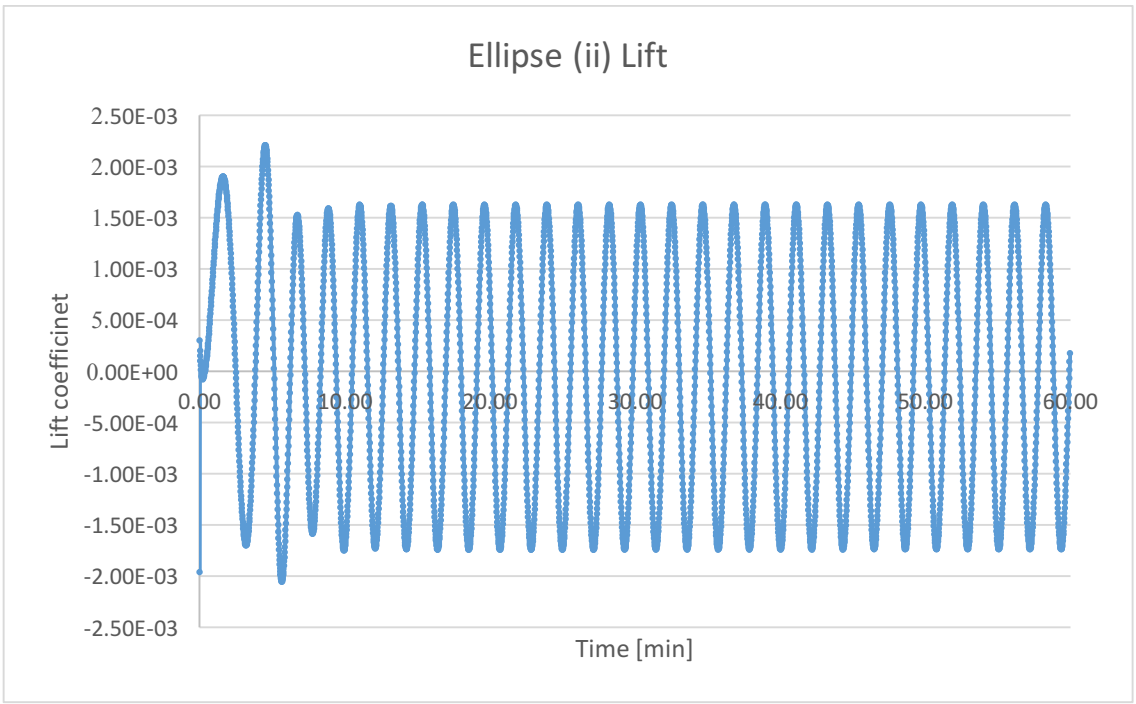

Figure 4: Lift of ellipse elongated in the x-direction.

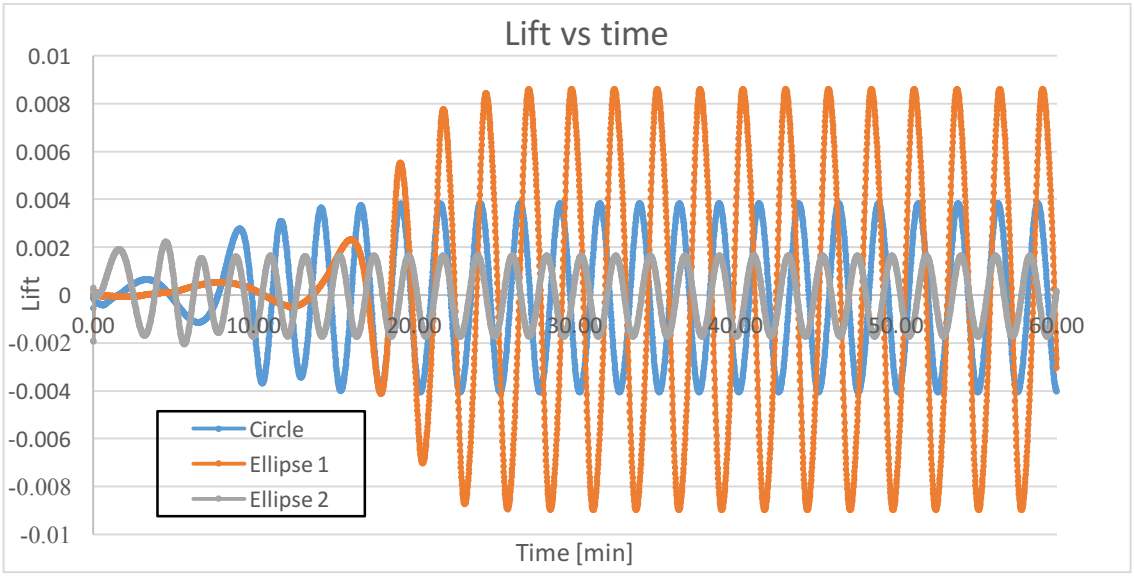

Figure 5: Lift comparison between the three different objects.

Fig. 5 above illustrates the lift coefficient of the three different objects. It is clear that the ellipse elongated in the y-direction creates the largest amplitudes in the oscillations.