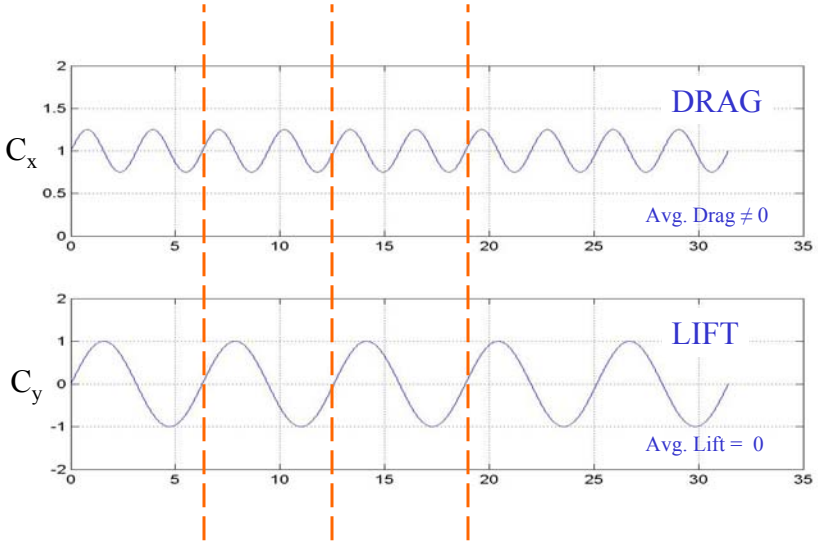
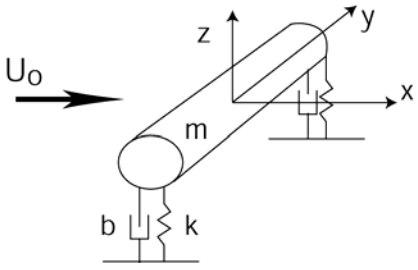
Force Time Trace



Alternate Vortex shedding causes oscillatory forces which induce structural vibrations



Rigid cylinder is now similar to a spring-mass system with a harmonic forcing term.

Heave Motion z(t)

$$z(t) = z_o \cos \omega t$$
$$\dot{z}(t) = -z_o \omega \sin \omega t$$
$$\ddot{z}(t) = -z_o \omega^2 \cos \omega t$$

LIFT = $L(t) = Lo \cos(\omega_s t + \psi)$

DRAG = $D(t) = Do \cos(2\omega_s t + \psi)$

$\omega_s = 2\pi f_s$