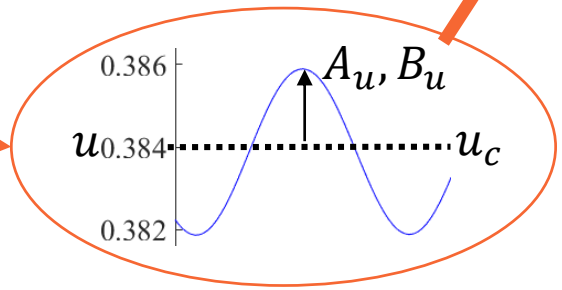
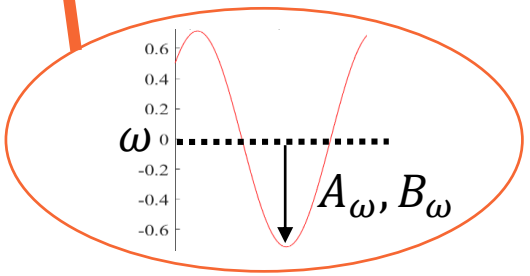
Start with swimmer simulation

steady state dynamics

Estimate limit cycle amplitudes $(A_u, B_u, A_\omega, B_\omega)$, and constant offset u_c





$$u = u_c + A_u cos2\Omega t + B_u sin2\Omega t$$
$$\omega = A_\omega cos\Omega t + B_\omega sin\Omega t$$

Sleigh equations of motion:
$\dot{u}(b, c, m, \omega)$
$\dot{\omega}(m, b, u, \tau, I, \omega)$

5 linear equations with 4 unknowns:
(b, c, m, I)

Use least square solver to obtain sleigh parameters
(b, c, m, I)