

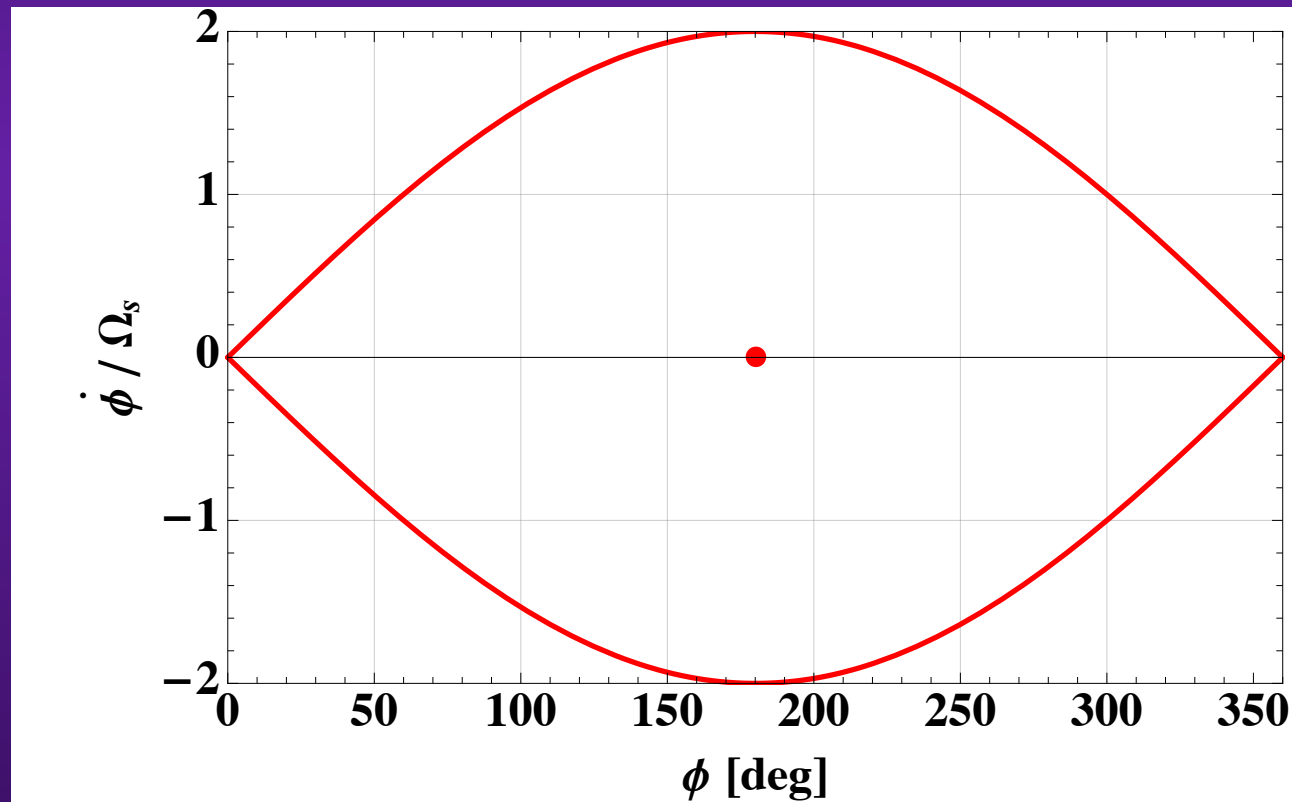
## Longitudinal separatrix ABOVE transition

$$\eta < 0$$

$$\cos \phi_s < 0$$

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} \left[ \cos \phi + \phi \sin \phi_s - \cos(\pi - \phi_s) - (\pi - \phi_s) \sin \phi_s \right]}$$

$$\phi_s = 180^\circ$$



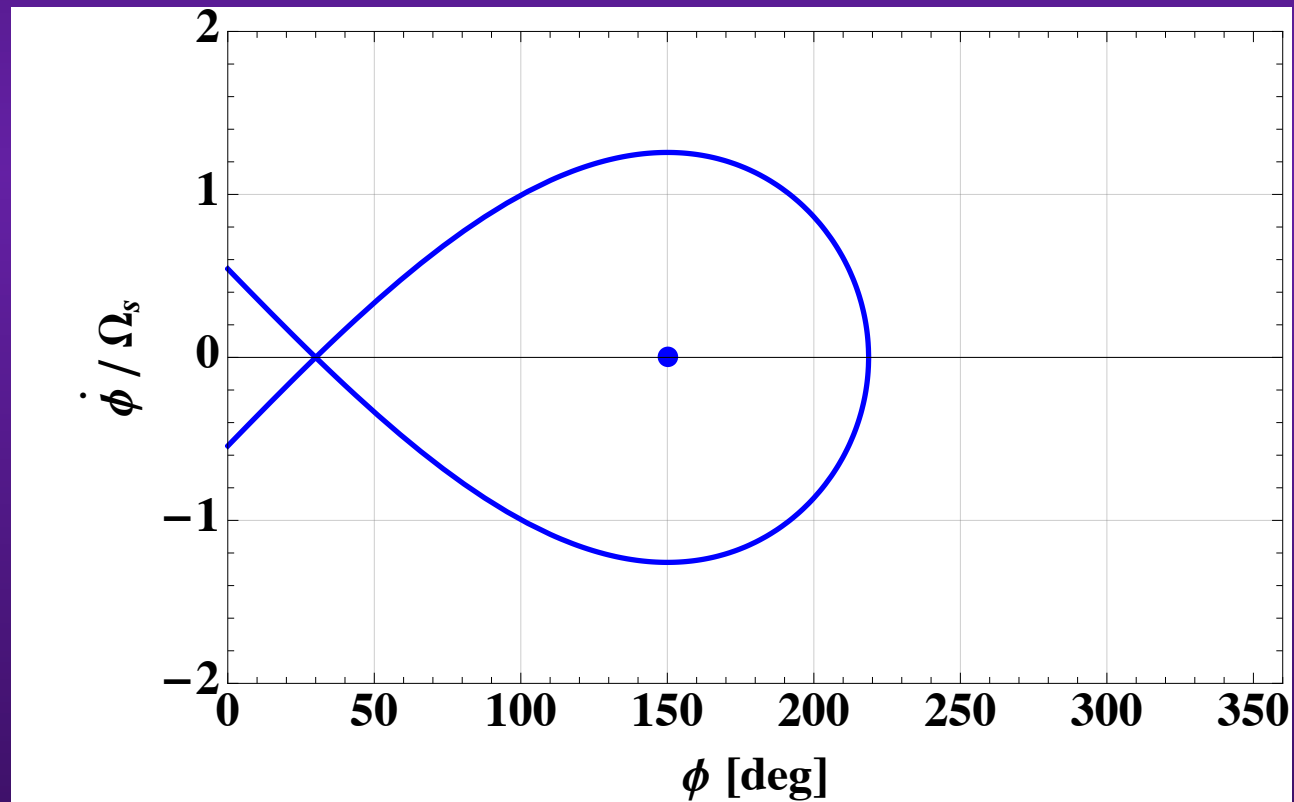
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$$\phi_s = 150^\circ$$



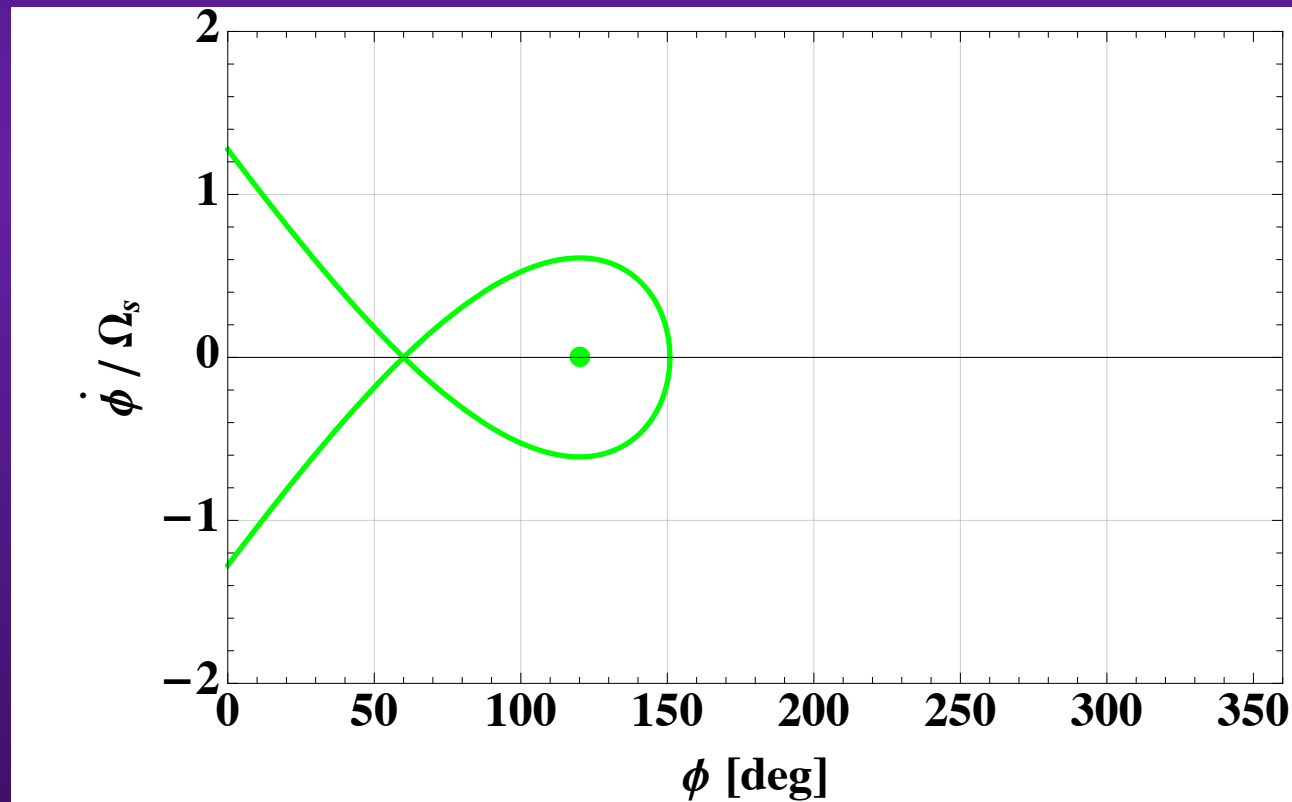
# Longitudinal separatrix ABOVE transition

$$\eta < 0$$

$$\cos \phi_s < 0$$

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} \left[ \cos \phi + \phi \sin \phi_s - \cos(\pi - \phi_s) - (\pi - \phi_s) \sin \phi_s \right]}$$

$$\phi_s = 120^\circ$$



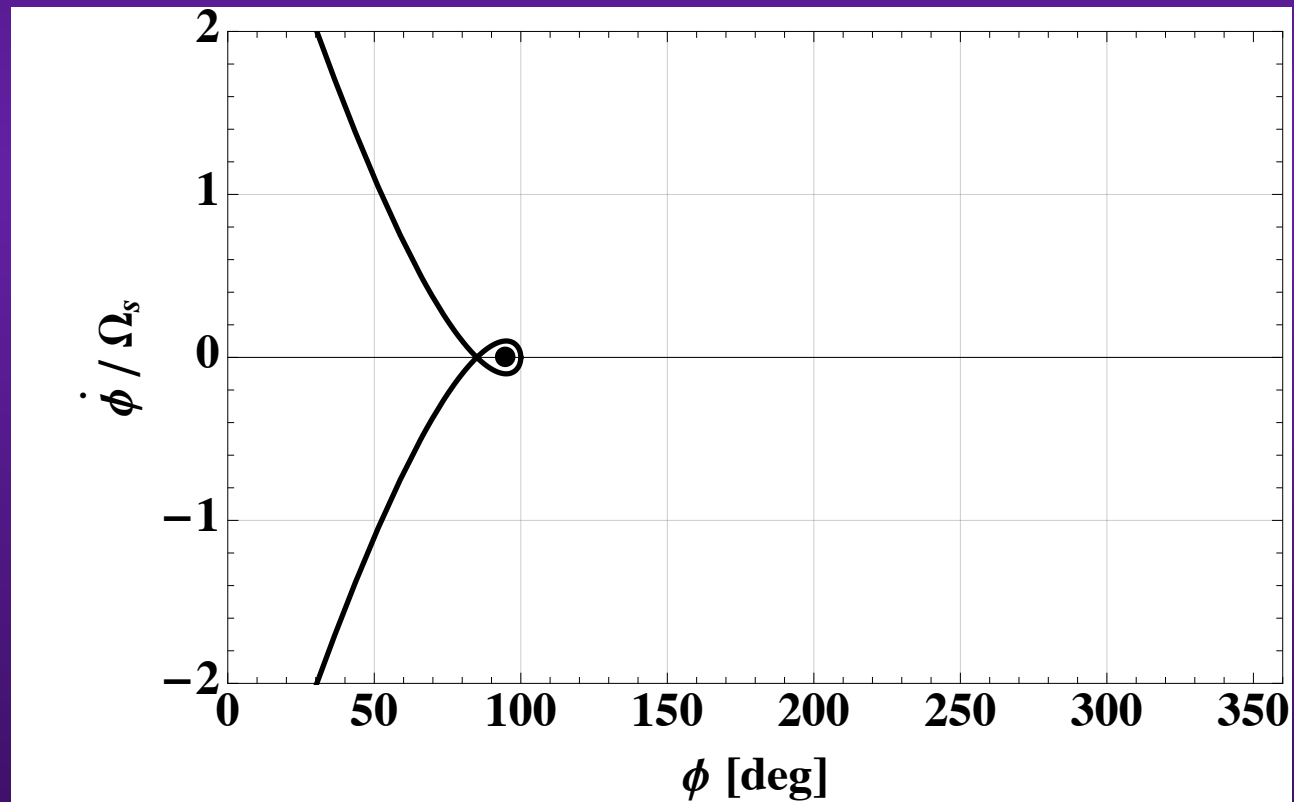
## Longitudinal separatrix ABOVE transition

$$\eta < 0$$

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$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} \left[ \cos \phi + \phi \sin \phi_s - \cos(\pi - \phi_s) - (\pi - \phi_s) \sin \phi_s \right]}$$

$$\phi_s = 95^\circ$$

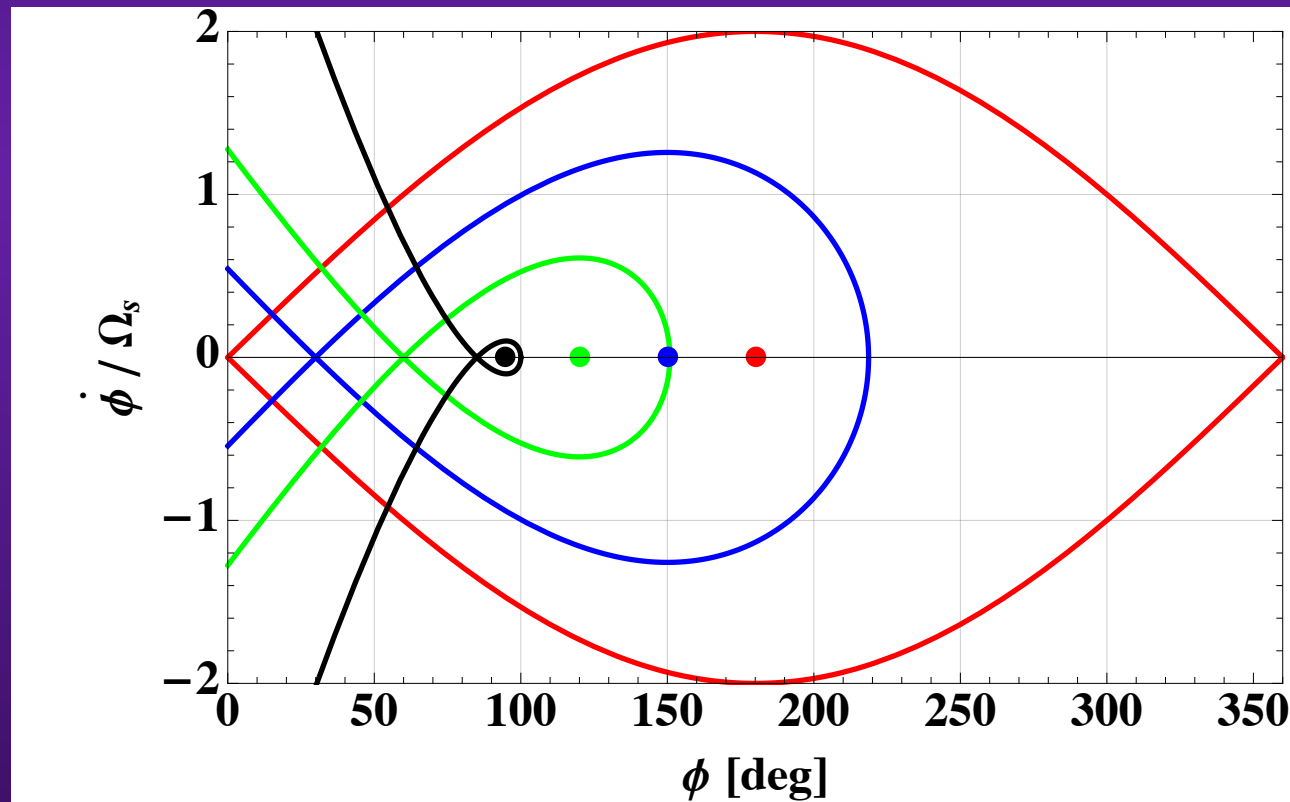


# Longitudinal separatrix ABOVE transition

$$\eta < 0$$

$$\cos \phi_s < 0$$

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} \left[ \cos \phi + \phi \sin \phi_s - \cos(\pi - \phi_s) - (\pi - \phi_s) \sin \phi_s \right]}$$



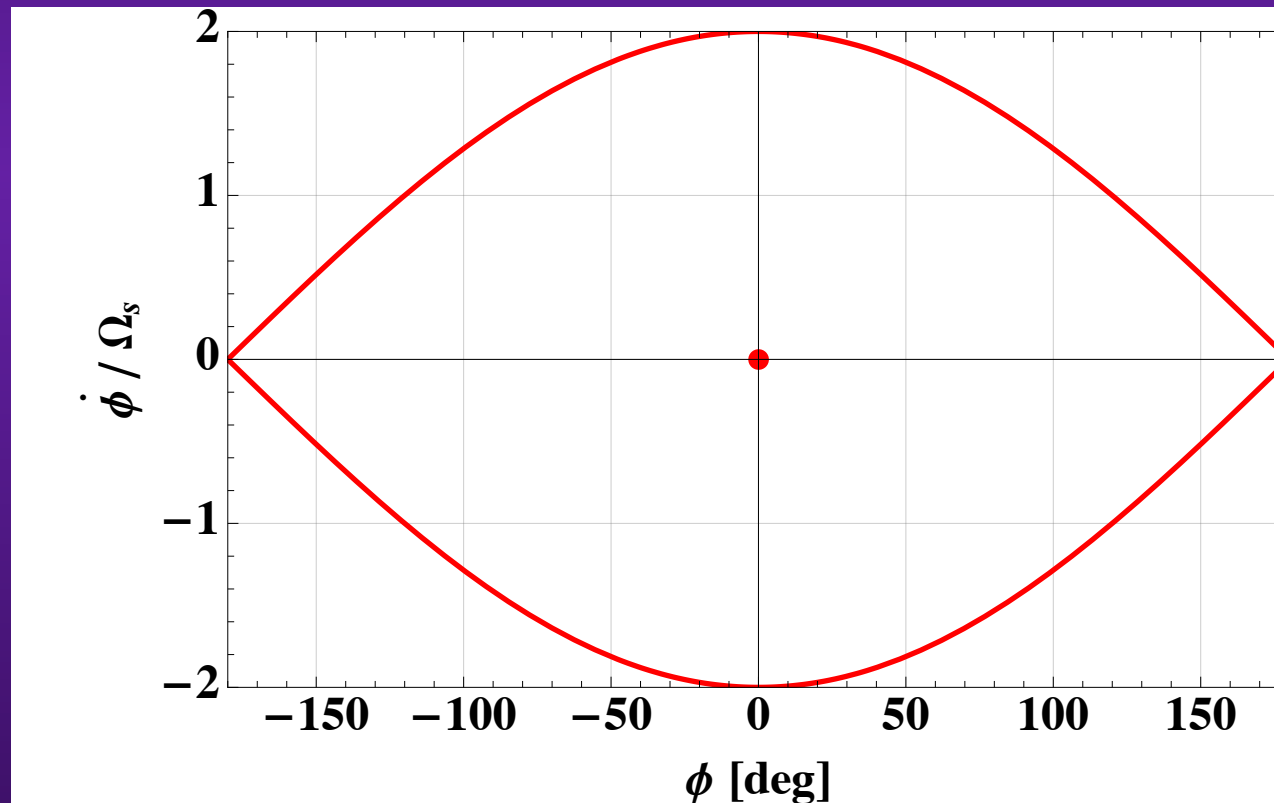
## Longitudinal separatrix BELOW transition

$$\eta > 0$$

$$\cos \phi_s > 0$$

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} \left[ \cos \phi + \phi \sin \phi_s - \cos(\pi - \phi_s) - (\pi - \phi_s) \sin \phi_s \right]}$$

$$\phi_s = 0^\circ$$



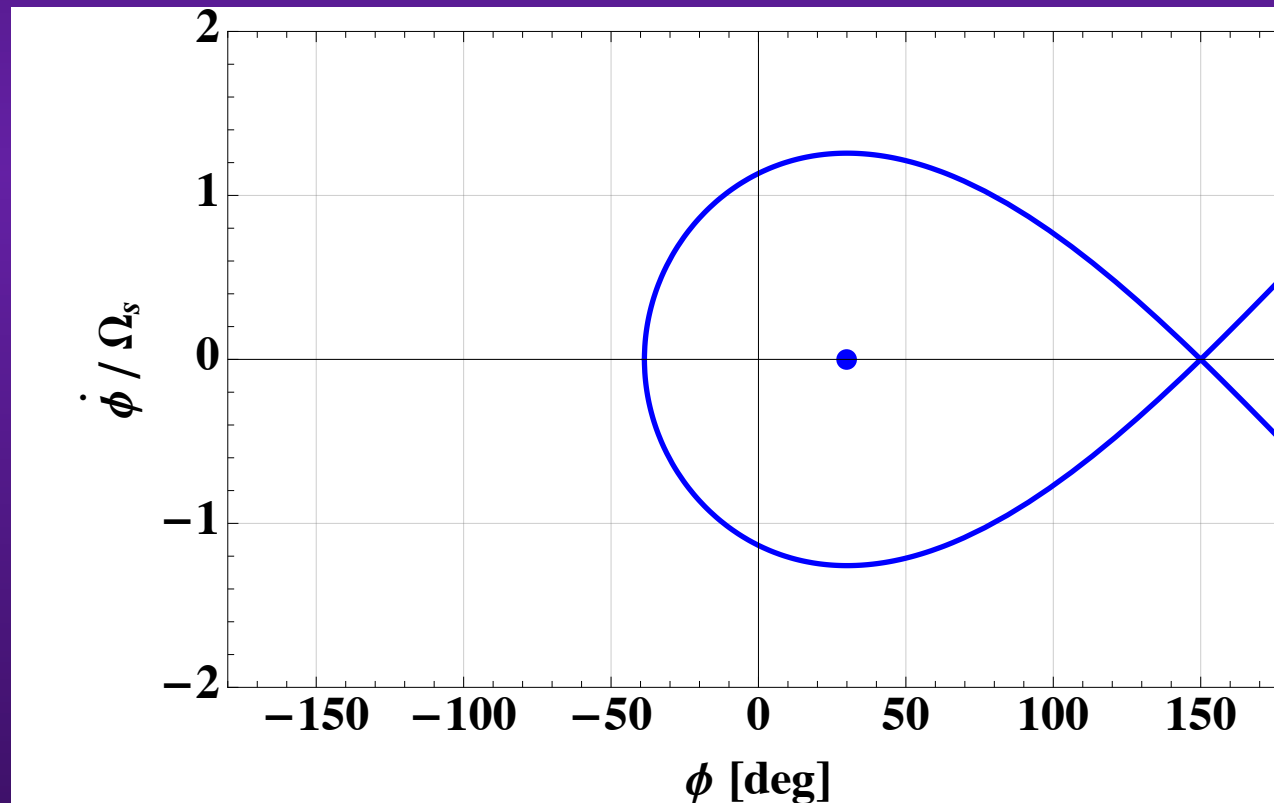
## Longitudinal separatrix BELOW transition

$$\eta > 0$$

$$\cos \phi_s > 0$$

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} \left[ \cos \phi + \phi \sin \phi_s - \cos(\pi - \phi_s) - (\pi - \phi_s) \sin \phi_s \right]}$$

$$\phi_s = 30^\circ$$



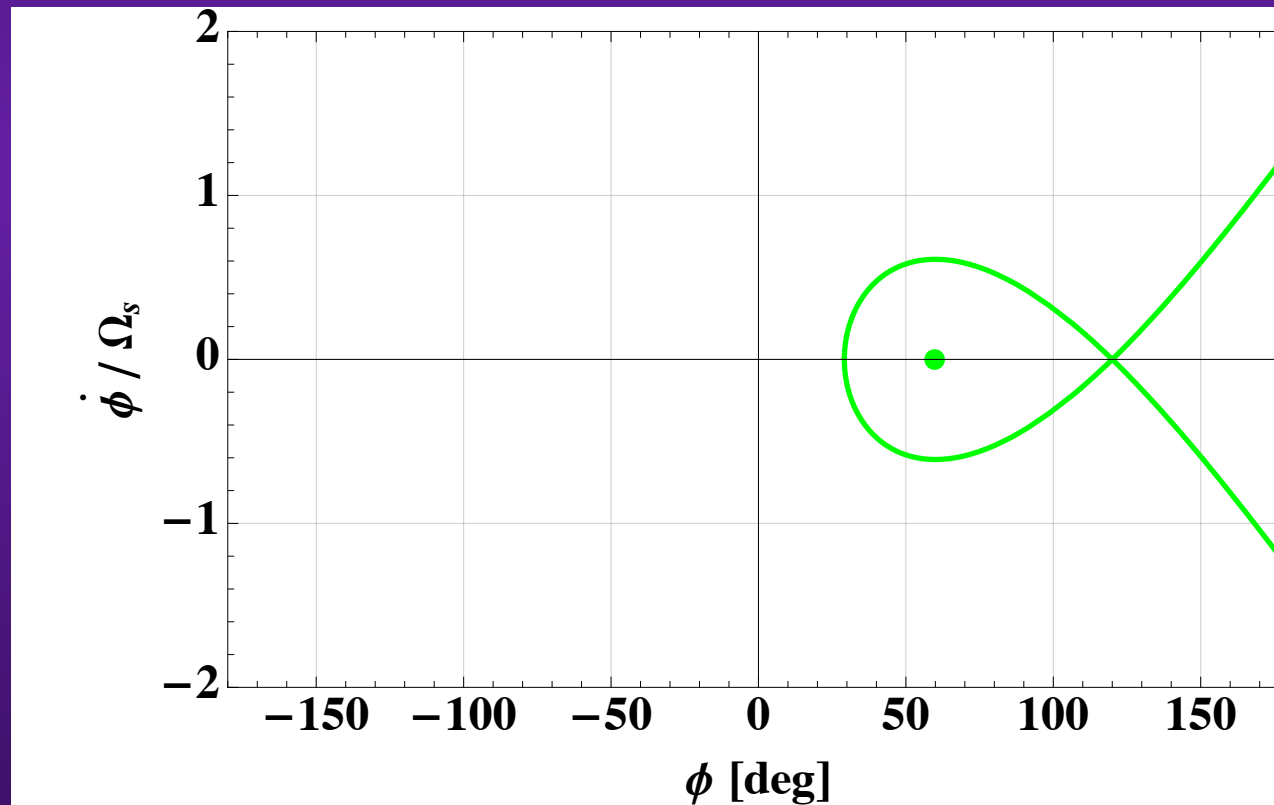
# Longitudinal separatrix BELOW transition

$$\eta > 0$$

$$\cos \phi_s > 0$$

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} \left[ \cos \phi + \phi \sin \phi_s - \cos(\pi - \phi_s) - (\pi - \phi_s) \sin \phi_s \right]}$$

$$\phi_s = 60^\circ$$





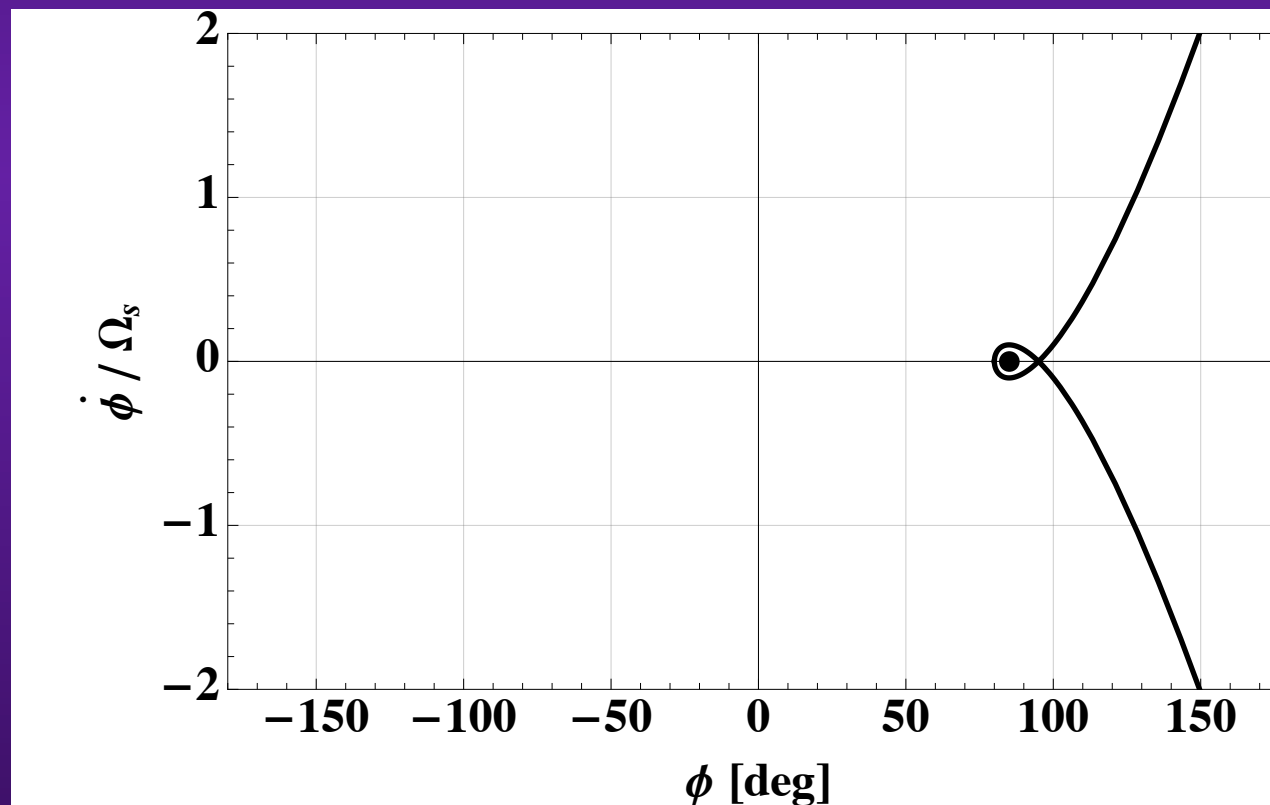
## Longitudinal separatrix BELOW transition

$$\eta > 0$$

$$\cos \phi_s > 0$$

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} \left[ \cos \phi + \phi \sin \phi_s - \cos(\pi - \phi_s) - (\pi - \phi_s) \sin \phi_s \right]}$$

$$\phi_s = 85^\circ$$

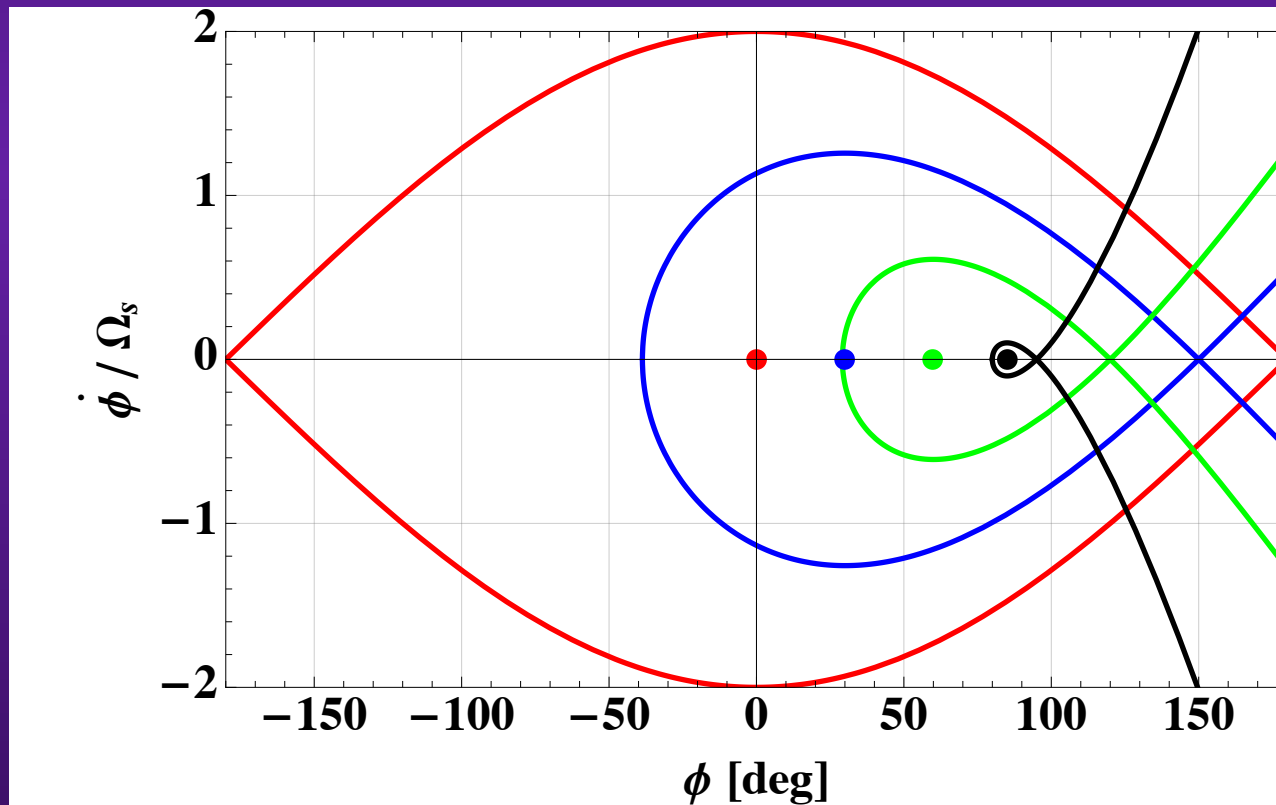


# Longitudinal separatrix BELOW transition

$$\eta > 0$$

$$\cos \phi_s > 0$$

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} \left[ \cos \phi + \phi \sin \phi_s - \cos(\pi - \phi_s) - (\pi - \phi_s) \sin \phi_s \right]}$$



# Some longitudinal particle trajectories BELOW transition

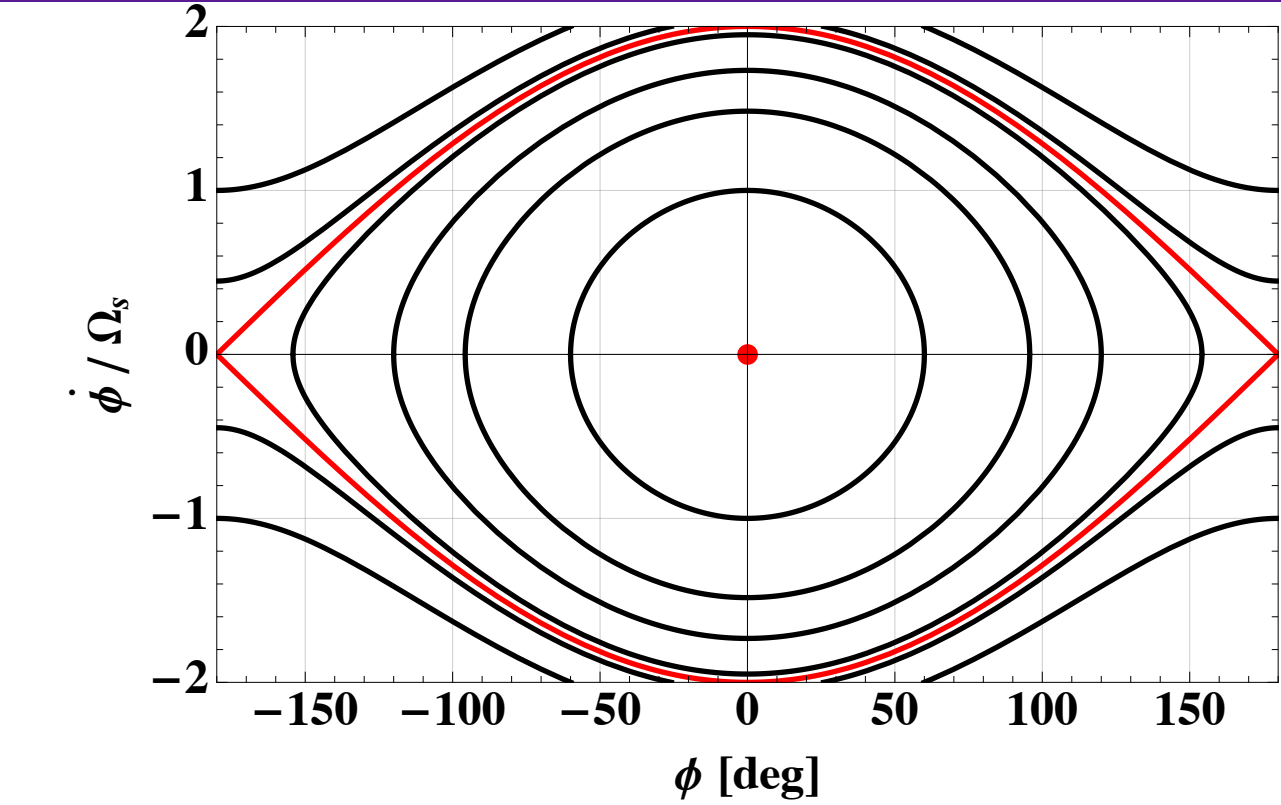
$$\eta > 0$$

$$\cos \phi_s > 0$$

The Cte has to be scanned

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} [\cos \phi + \phi \sin \phi_s + Cste]}$$

$$\phi_s = 0^\circ$$



# Some longitudinal particle trajectories BELOW transition

$$\eta > 0$$

The Cte has to be scanned

$$\cos \phi_s > 0$$

$$\frac{\dot{\phi}}{\Omega_s} = \pm \sqrt{\frac{2}{\cos \phi_s} [\cos \phi + \phi \sin \phi_s + Cste]}$$

$$\phi_s = 30^\circ$$

