Lecture 6: Animations

31.10.2018

Note: You need Adobe Reader to be able to see the animations in this pdf. If you are interested in the code for these animations or have any questions, contact maurice.filo@bsse.ethz.ch.

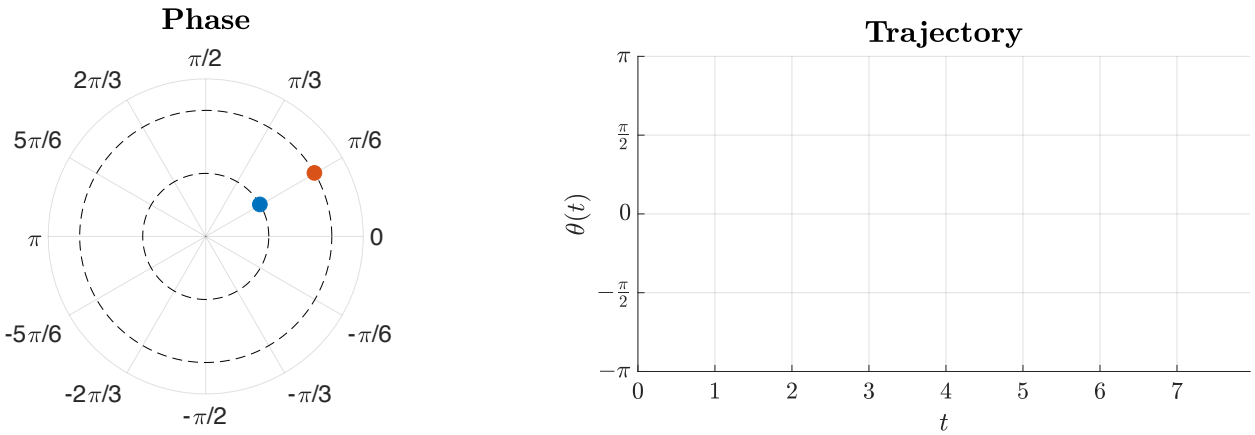

Figure 1: Simulation of the Uniform Oscillator $\dot{\theta} = \omega$ with some initial condition. The blue dot corresponds to the case where $\omega > 0$, and the red dot corresponds to the case where $\omega < 0$.

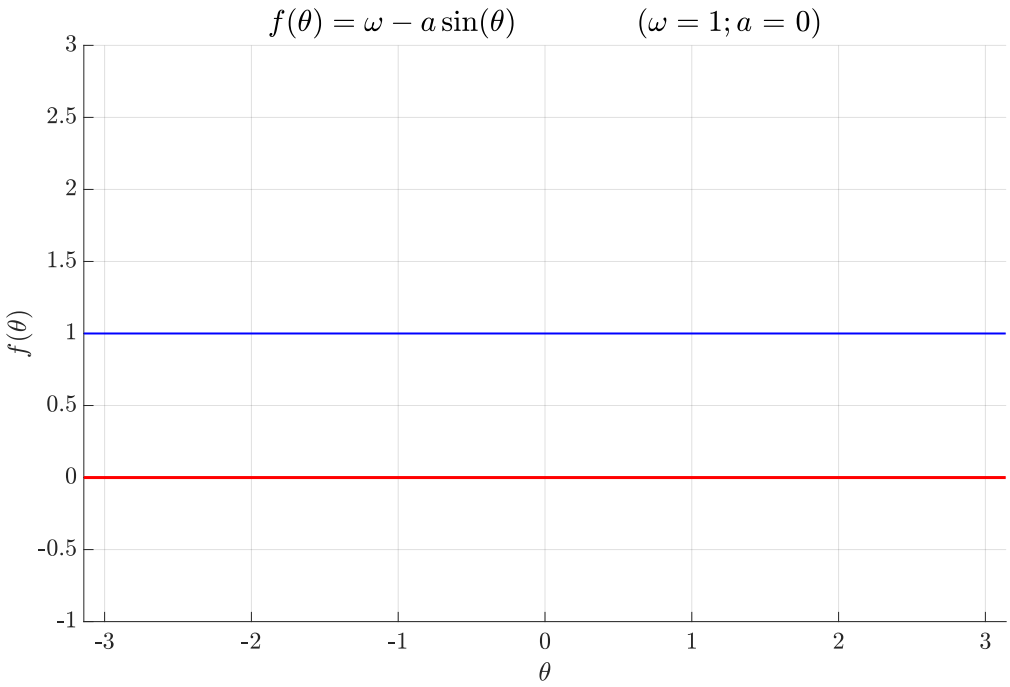

Figure 2: This figure plot $f(\theta) = \omega - a\sin(\theta)$ by sweeping a from 0 to 1.5, and fixing $\omega = 1$.

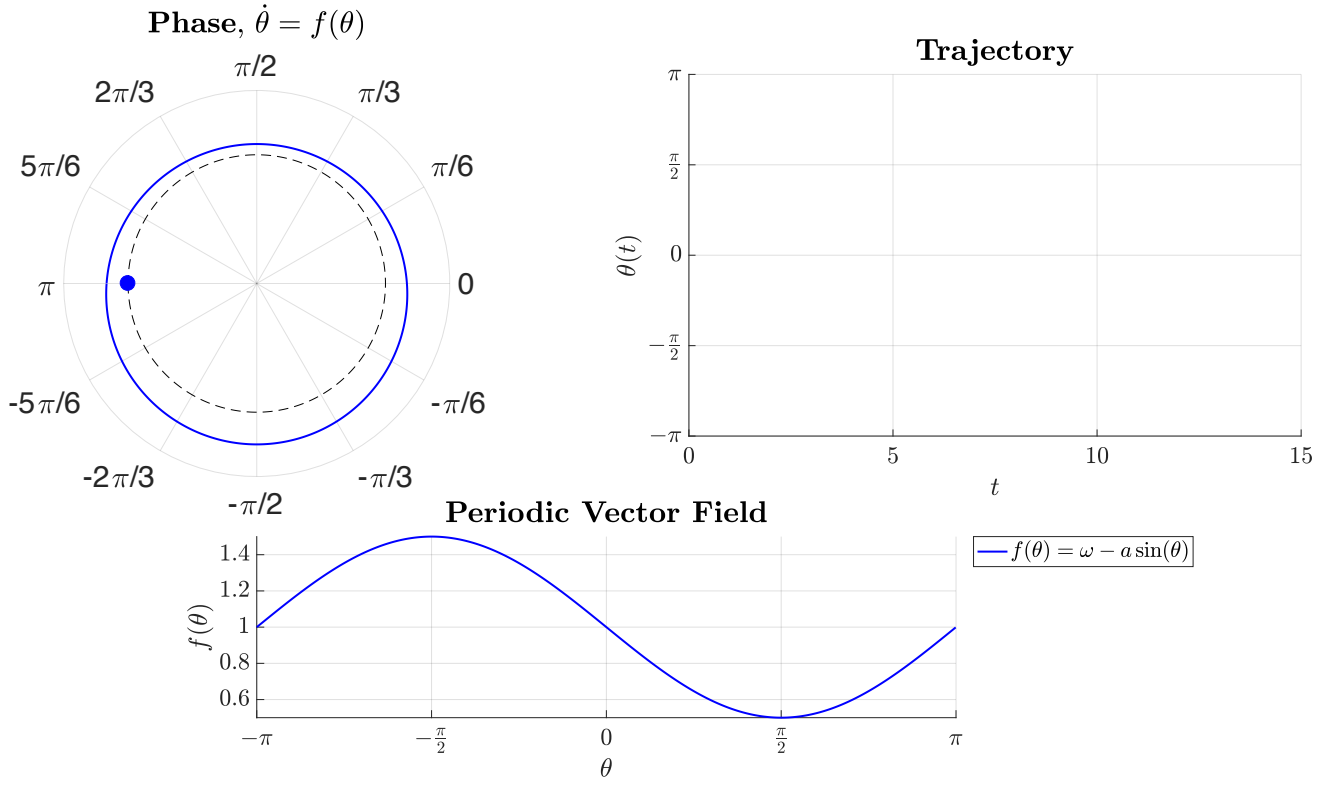

Figure 3: Simulation of the Nonuniform Oscillator $\dot{\theta} = \omega - a\sin(\theta)$ with some initial condition. In this figure, we let $a < \omega$, particularly $\omega = 1$ and $a = 0.5$.

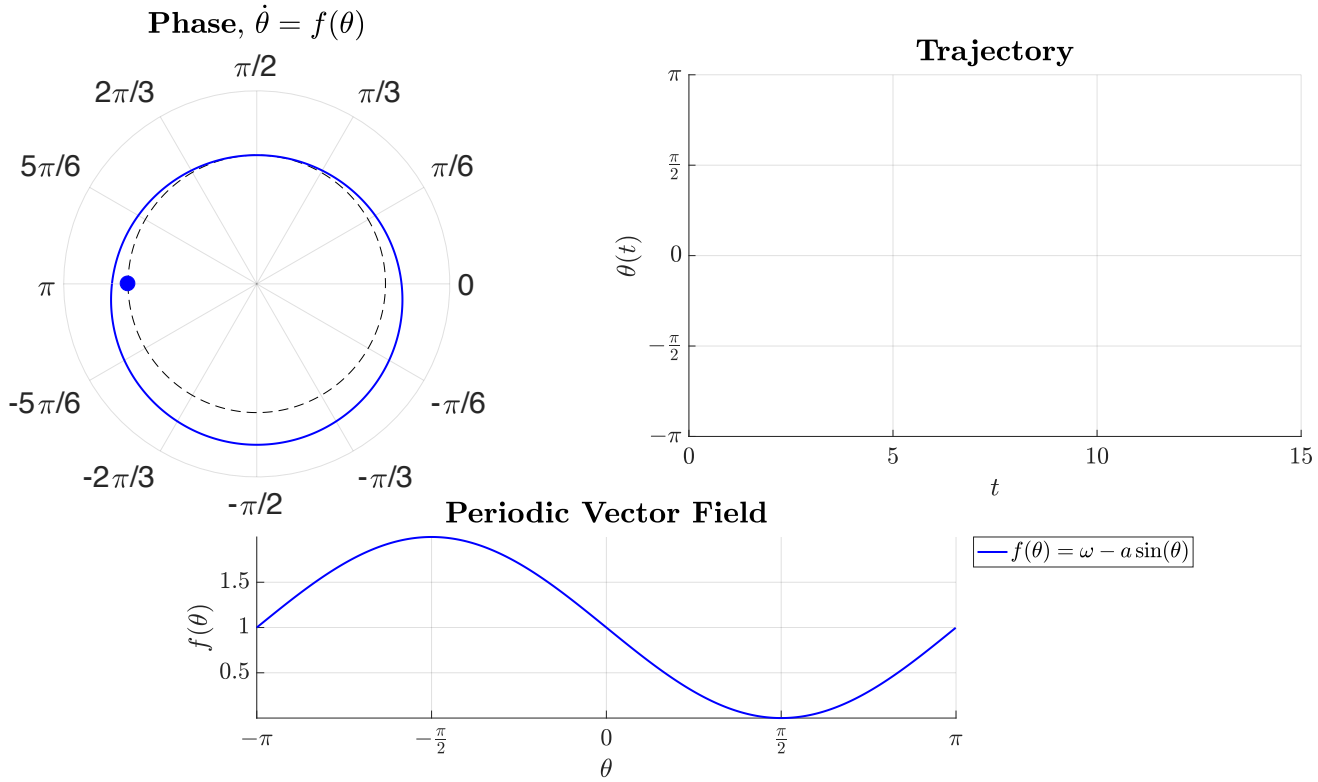

Figure 4: Simulation of the Nonuniform Oscillator $\dot{\theta} = \omega - a\sin(\theta)$ with some initial condition. In this figure, we let $a = \omega$, particularly $\omega = a = 1$.

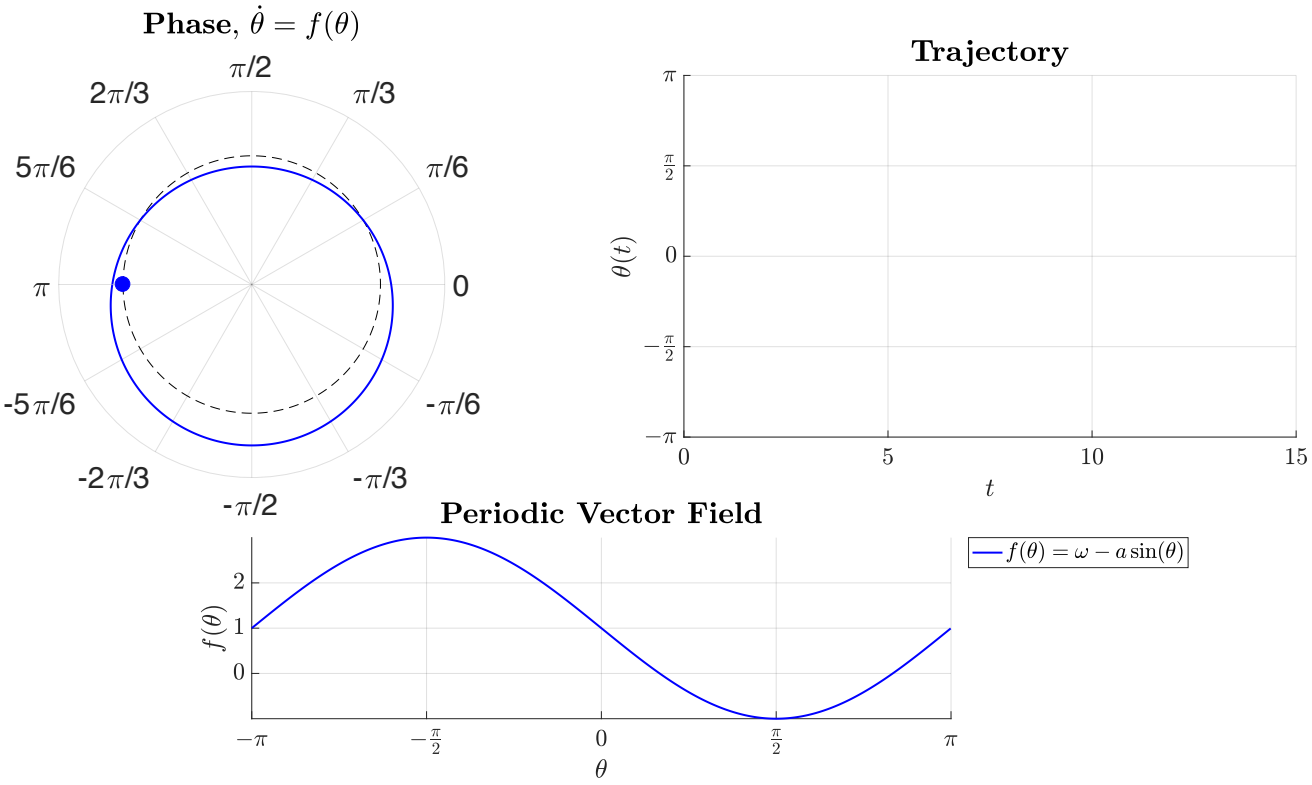

Figure 5: Simulation of the Nonuniform Oscillator $\dot{\theta} = \omega - a\sin(\theta)$ with some initial condition. In this figure, we let $a > \omega$, particularly $\omega = 1$ and $a = 2$.

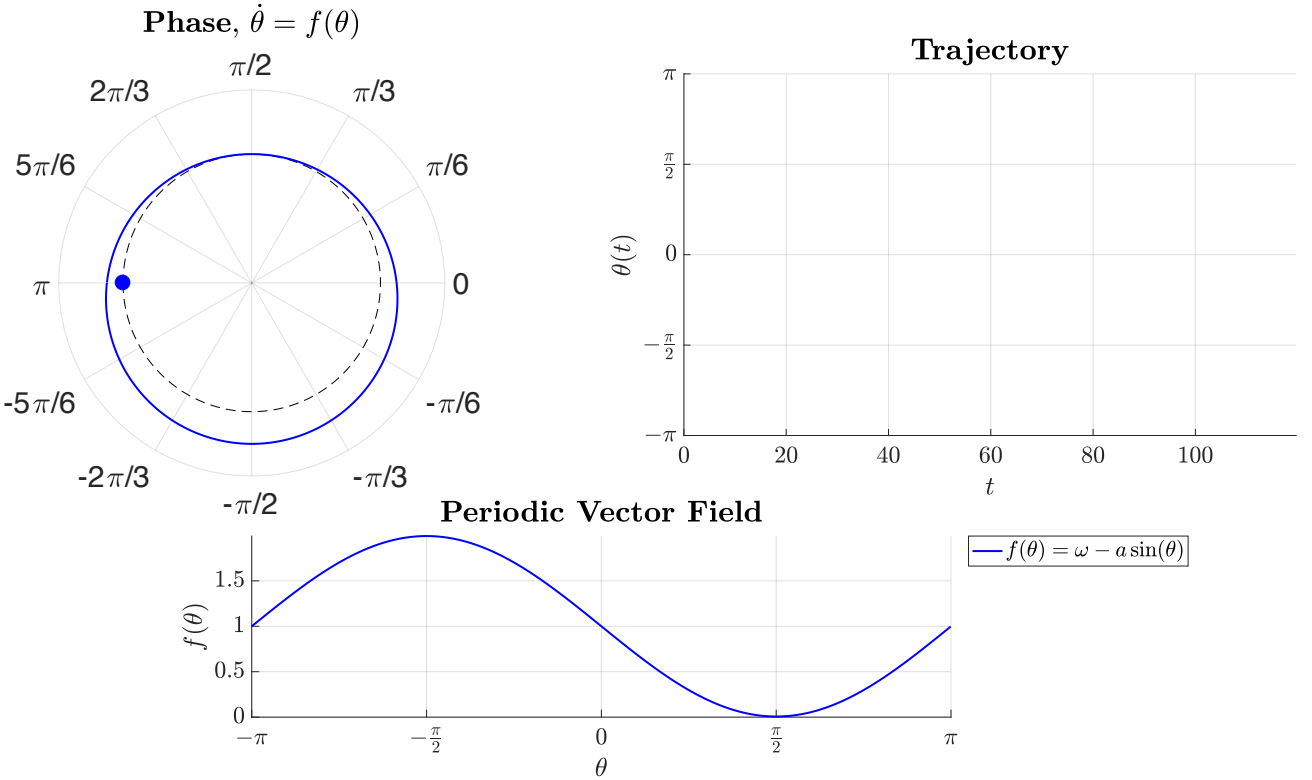

Figure 6: Dynamics with a "ghost". Simulation of the Nonuniform Oscillator $\dot{\theta} = \omega - a\sin(\theta)$ with some initial condition. In this figure, we let $a \approx \omega$, particularly $\omega = 1$ and $a = 0.993$. So the blue curves in the top left and bottom figures come very close to the circular axis and horizontal axis, respectively, but never touch them.

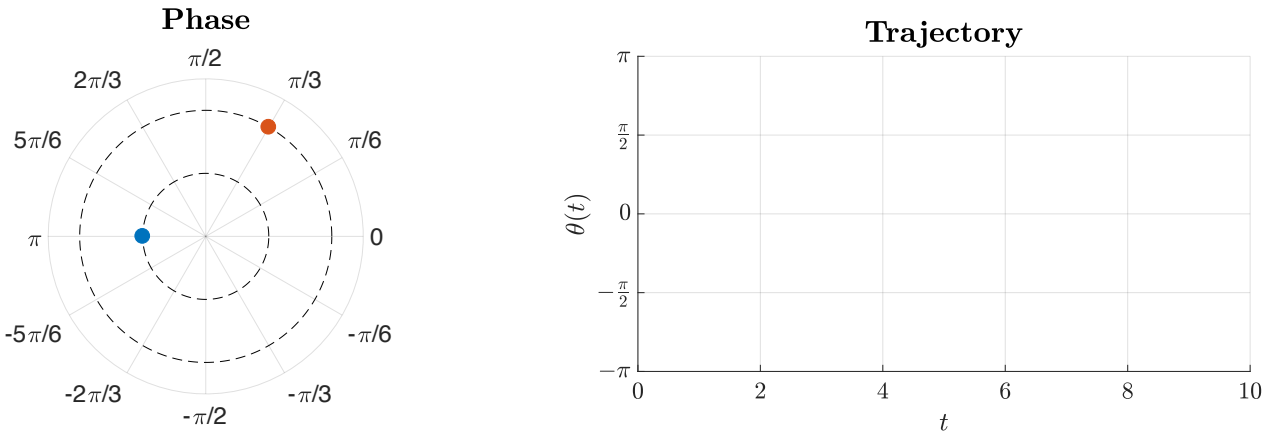

Figure 7: Simulation of a model for flashlight-firefly experiment. The model is given by $\dot{\theta}_1 = \Omega, \dot{\theta}_2 = \omega + A\sin(\theta_1 - \theta_2)$. The blue dot represents θ_1 and the red one represents θ_2. In this figure, we let $\Omega = \omega$, particularly $\Omega = \omega = \pi/2$ and $A = \pi/7$. The firefly and the flashlight are synchronized.

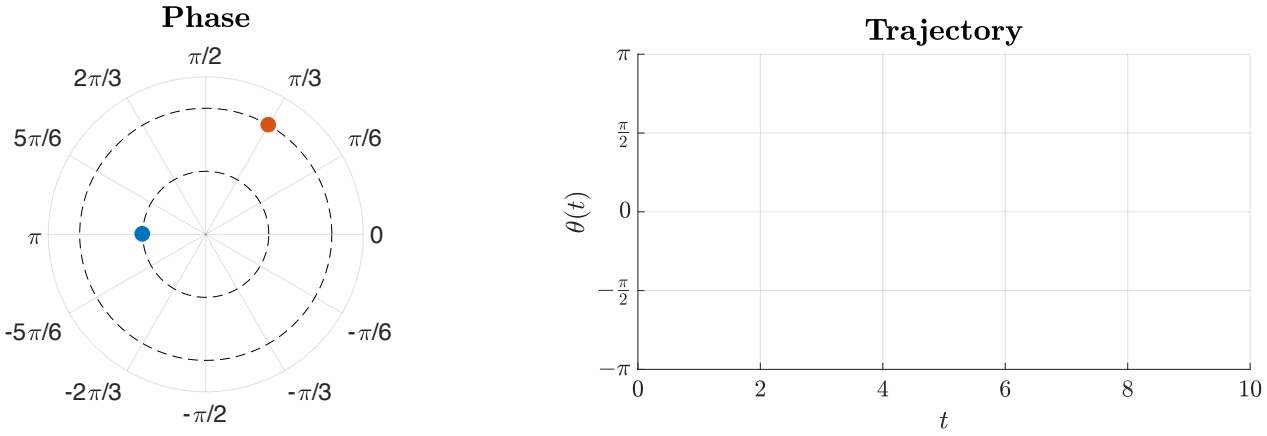

Figure 8: Simulation of a model for flashlight-firefly experiment. The model is given by $\dot{\theta}_1 = \Omega, \dot{\theta}_2 = \omega + A\sin(\theta_1 - \theta_2)$. The blue dot represents θ_1 and the red one represents θ_2. In this figure, we let $0 < \Omega - \omega < A$, particularly $\Omega = 2\pi/3, \omega = \pi/2$ and $A = \pi/5$. The firefly and the flashlight are phase-locked.

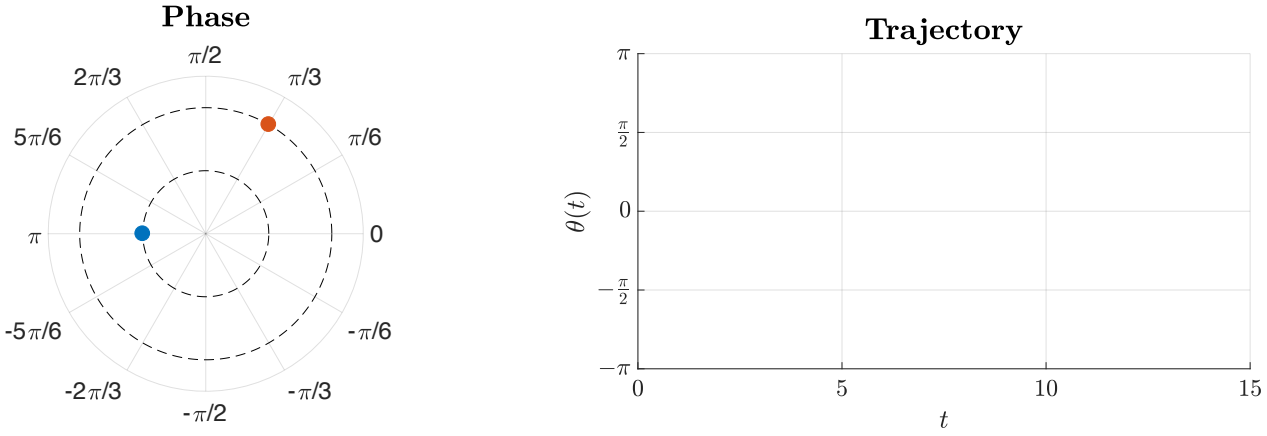

Figure 9: Simulation of a model for flashlight-firefly experiment. The model is given by $\dot{\theta}_1 = \Omega, \dot{\theta}_2 = \omega + A\sin(\theta_1 - \theta_2)$. The blue dot represents θ_1 and the red one represents θ_2. In this figure, we let $\Omega - \omega > A$, particularly $\Omega = 2\pi/3, \omega = \pi/2$ and $A = \pi/7$. The firefly and the flashlight exhibit a phase-drift.