

WORKSHOP  
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## Determining firing phases in CPG networks

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### **Abstract**

In many oscillatory central pattern generating networks the relative activity phase between groups of neurons remains fixed despite large variations in network frequency. We construct and analyze a model network of the pyloric rhythm of the crustacean stomatogastric ganglion consisting of an oscillator neuron that inhibits two reciprocally inhibitory follower neurons. We derive analytic expressions that determine the phase of firing of the follower neurons with respect to the oscillator in the case when the synapses exhibit short-term synaptic depression. These type of synapses allow there to be a complicated relationship between the intrinsic properties of the neurons and the synapses between them. Our analysis reveals the circumstances and ranges of cycle periods under which these properties work in concert with or independently from one another in determining the activity phase.