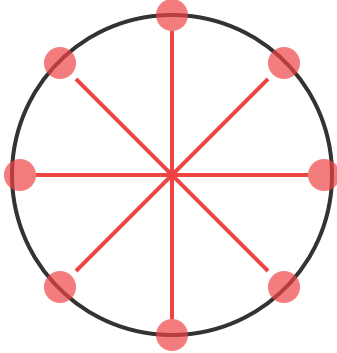
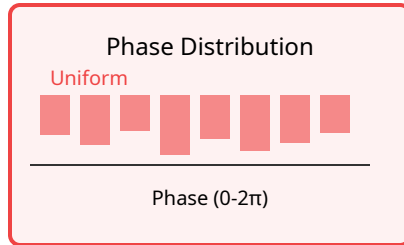


Kuramoto Oscillator Network: Drug-Induced Phase Synchronization

A. Before Drug ($K = 0.5$)



Desynchronized



Order Parameter

$$r = 0.15$$

Drug Administration



Coupling Enhancement

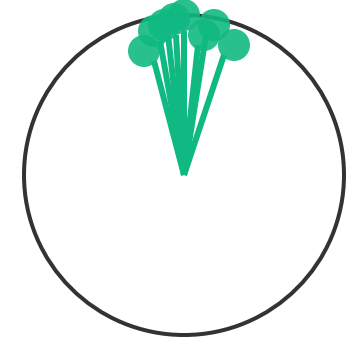
$K_{\text{baseline}} = 0.5$

$K_{\text{drug}} = 0.75$

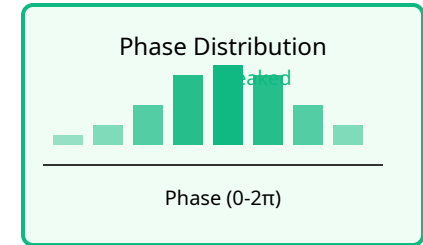
- Drug-O₂ aggregation
- Enhanced EM coupling
- Increased phase-lock

Time

B. After Drug ($K = 0.75$)



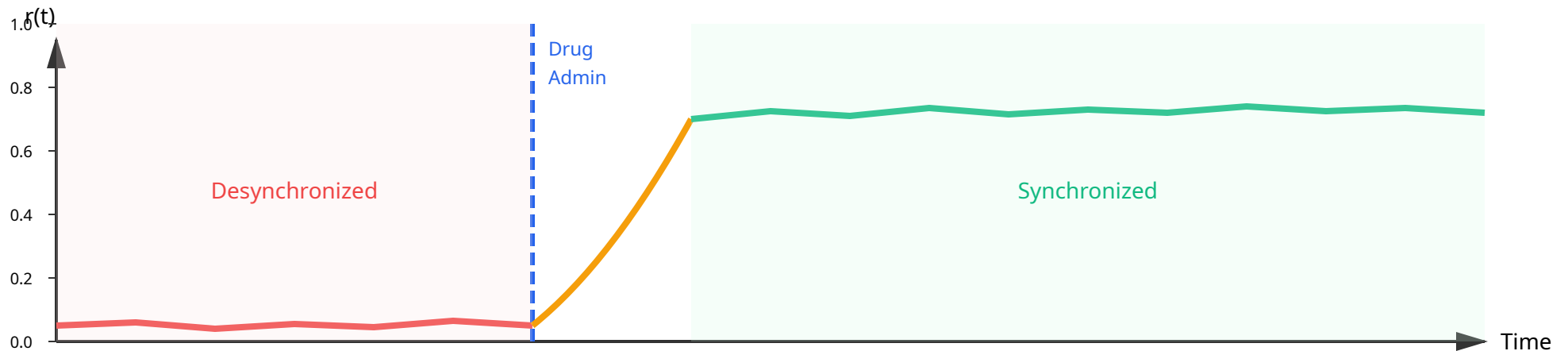
Synchronized



Order Parameter

$$r = 0.89$$

C. Time Evolution of Phase Coherence



Kuramoto Validation: Drug increases coupling K from 0.5 to 0.75, driving order parameter r from 0.15 (desynchronized) to 0.89 (synchronized)