

Supplementary Information for RCNNG Simulations

$0.5cm]$

Supplementary Figure S1–S7: Input Signal

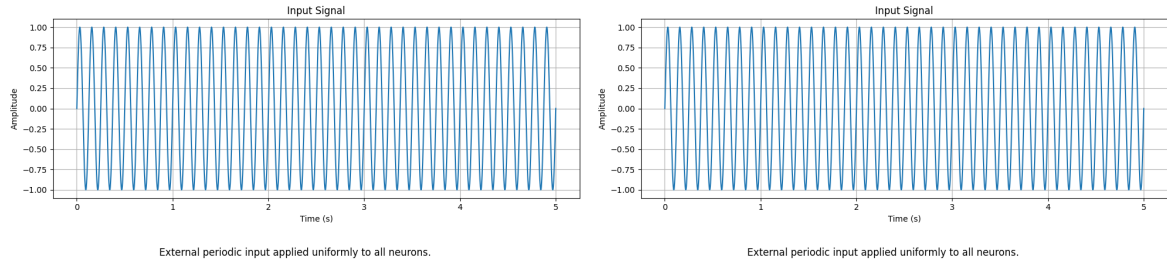


Figure 1: Input Signal – 50 and 80 neurons

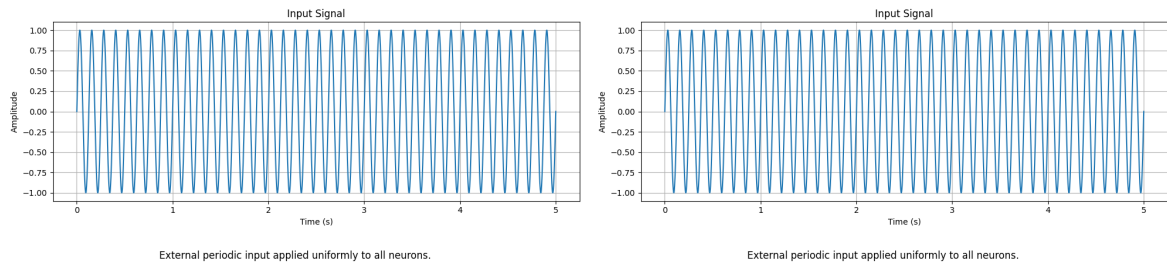


Figure 2: Input Signal – 100 and 200 neurons

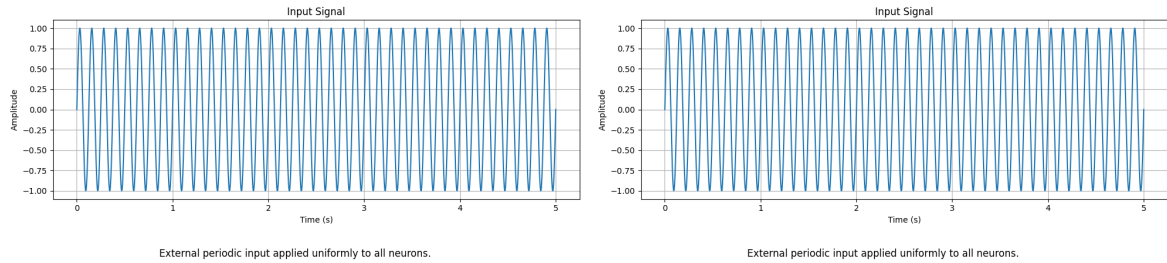


Figure 3: Input Signal – 500 and 2000 neurons

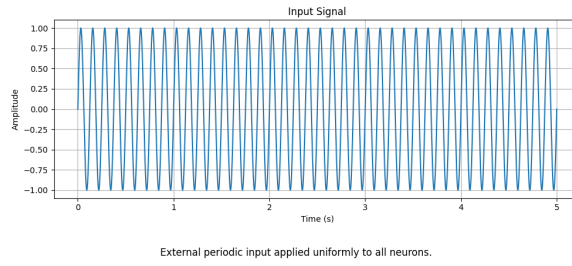


Figure 4: Input Signal – 5000 neurons

Supplementary Figure S1–S7: Mean Activity of All Neurons

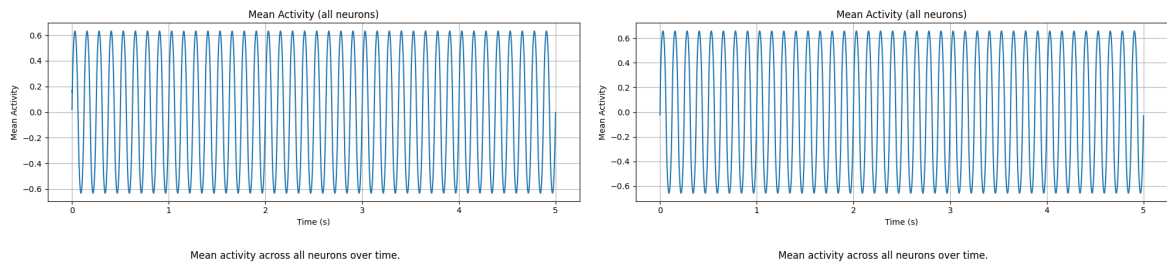


Figure 5: Mean Activity – 50 and 80 neurons

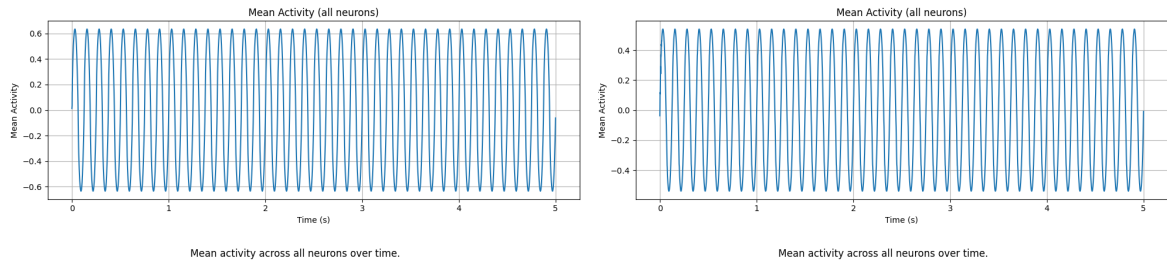


Figure 6: Mean Activity – 100 and 200 neurons

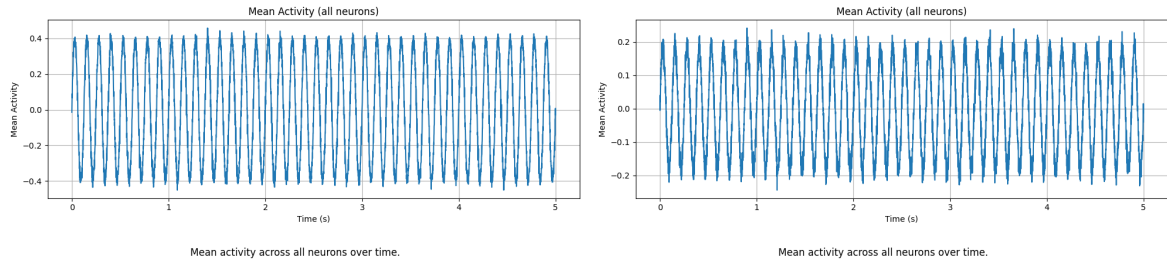


Figure 7: Mean Activity – 500 and 2000 neurons

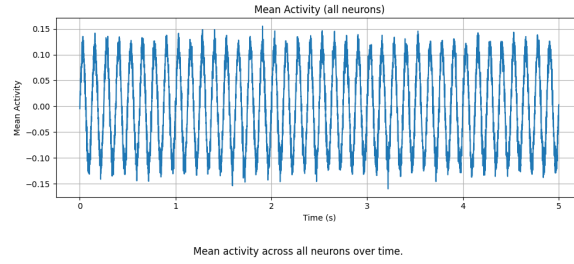


Figure 8: Mean Activity – 5000 neurons

Supplementary Figure S1–S7: Hilbert Phase of Neuron 1

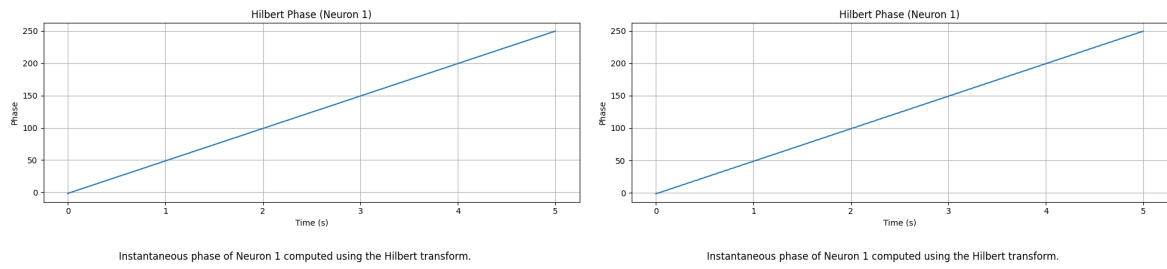
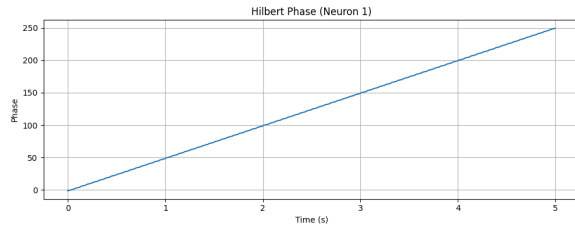
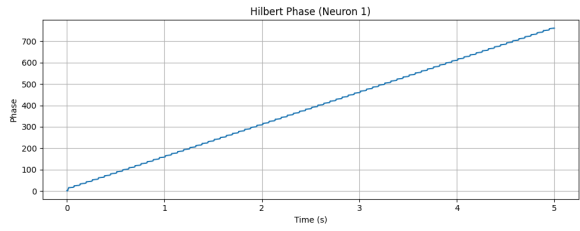


Figure 9: Hilbert Phase – 50 and 80 neurons

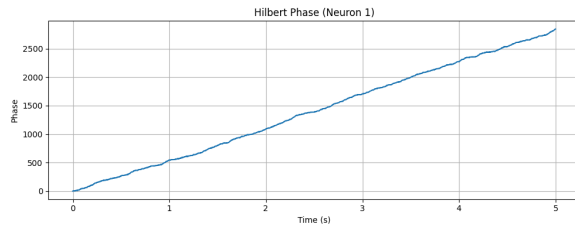


Instantaneous phase of Neuron 1 computed using the Hilbert transform.

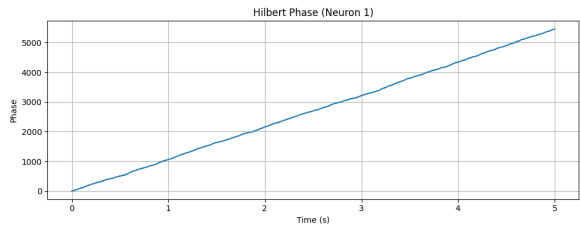


Instantaneous phase of Neuron 1 computed using the Hilbert transform.

Figure 10: Hilbert Phase – 100 and 200 neurons

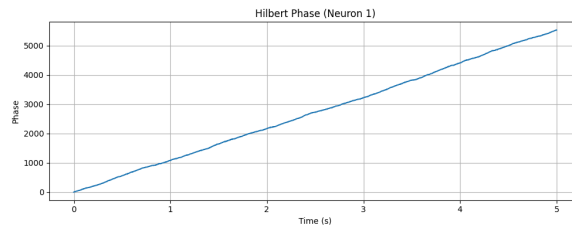


Instantaneous phase of Neuron 1 computed using the Hilbert transform.



Instantaneous phase of Neuron 1 computed using the Hilbert transform.

Figure 11: Hilbert Phase – 500 and 2000 neurons



Instantaneous phase of Neuron 1 computed using the Hilbert transform.

Figure 12: Hilbert Phase – 5000 neurons

Supplementary Figure S1–S7: Network Connectivity

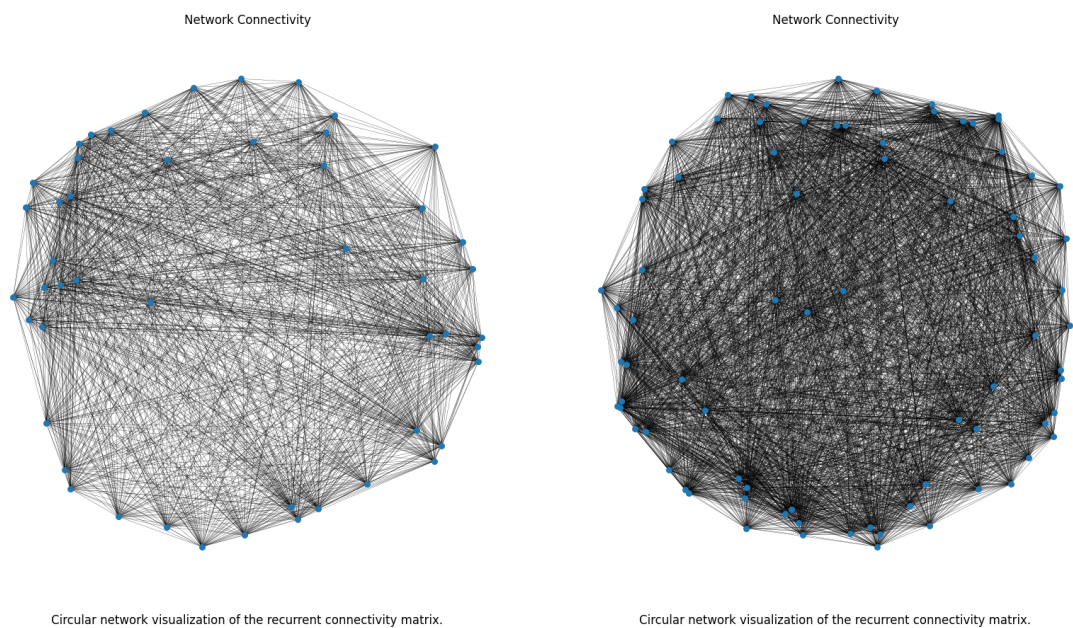


Figure 13: Network Connectivity – 50 and 80 neurons

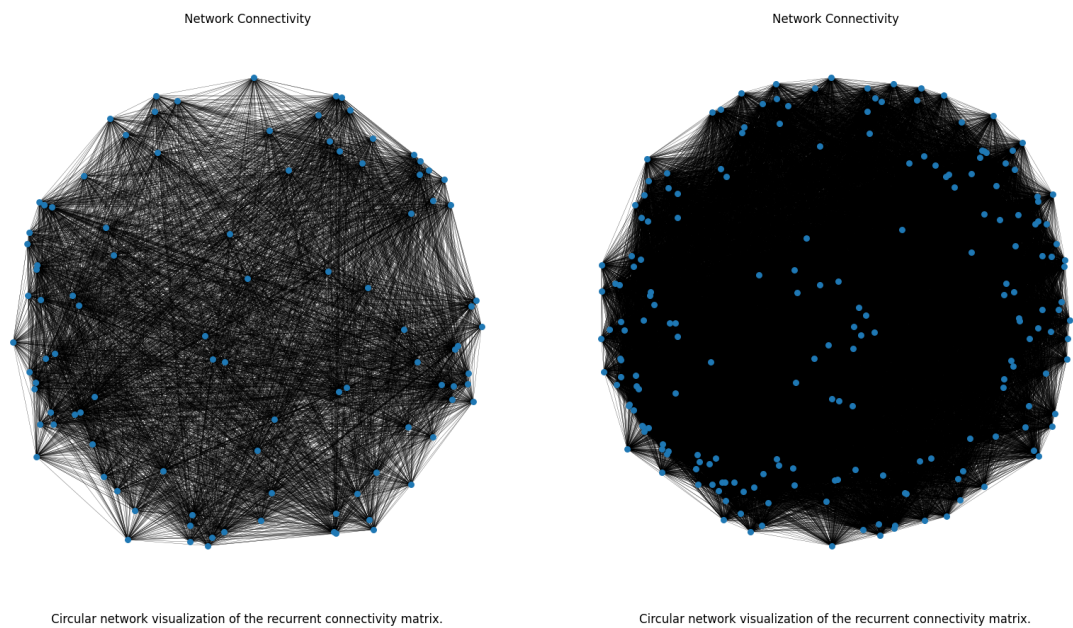


Figure 14: Network Connectivity – 100 and 200 neurons

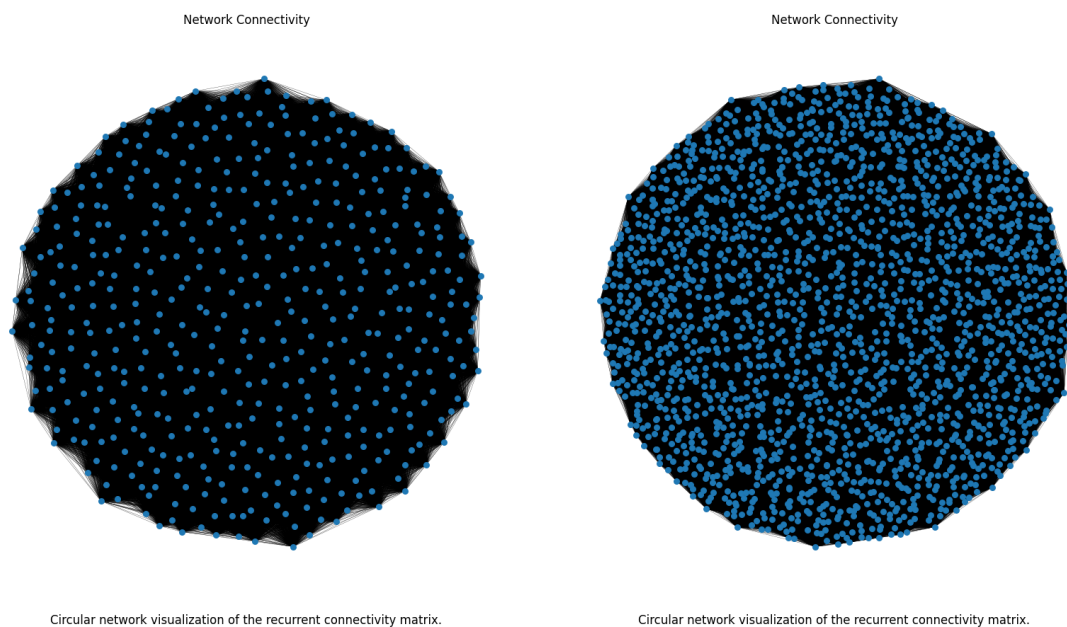


Figure 15: Network Connectivity – 500 and 2000 neurons

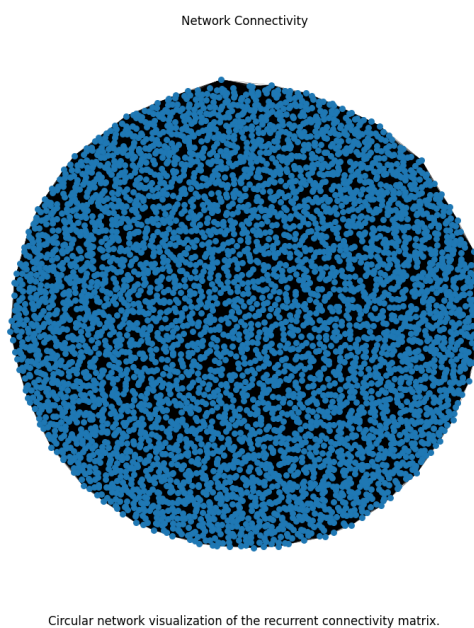


Figure 16: Network Connectivity – 5000 neurons

Supplementary Figure S1–S7: FFT Spectrum of Neuron 1

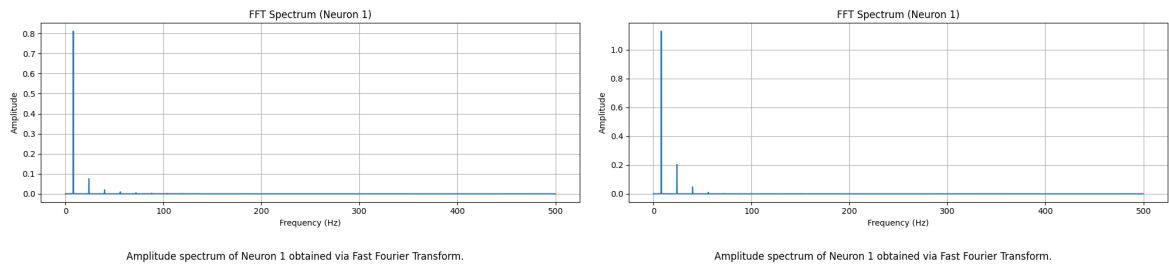


Figure 17: FFT Spectrum – 50 and 80 neurons

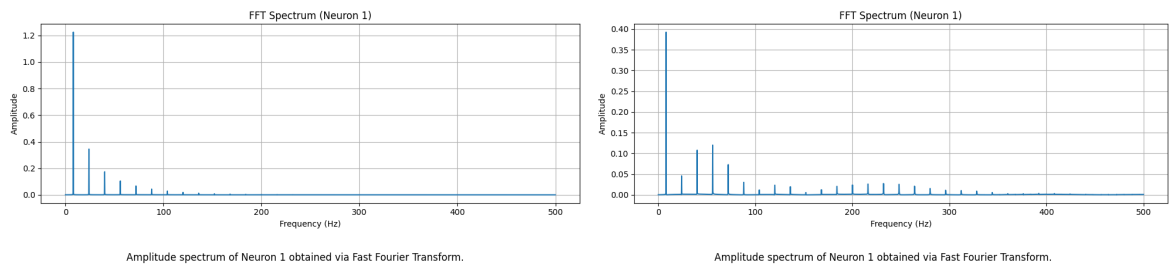


Figure 18: FFT Spectrum – 100 and 200 neurons

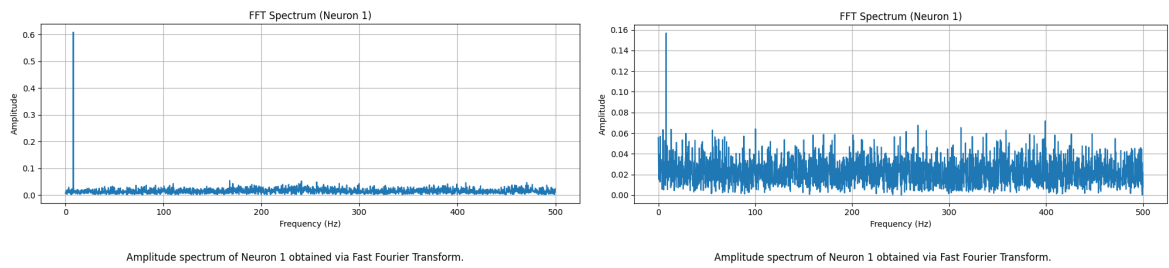


Figure 19: FFT Spectrum – 500 and 2000 neurons

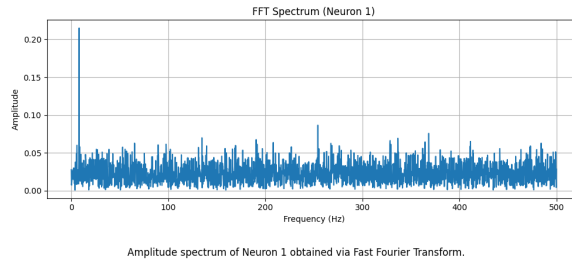


Figure 20: FFT Spectrum – 5000 neurons

Supplementary Figure S1–S7: Correlation Matrix of Neurons

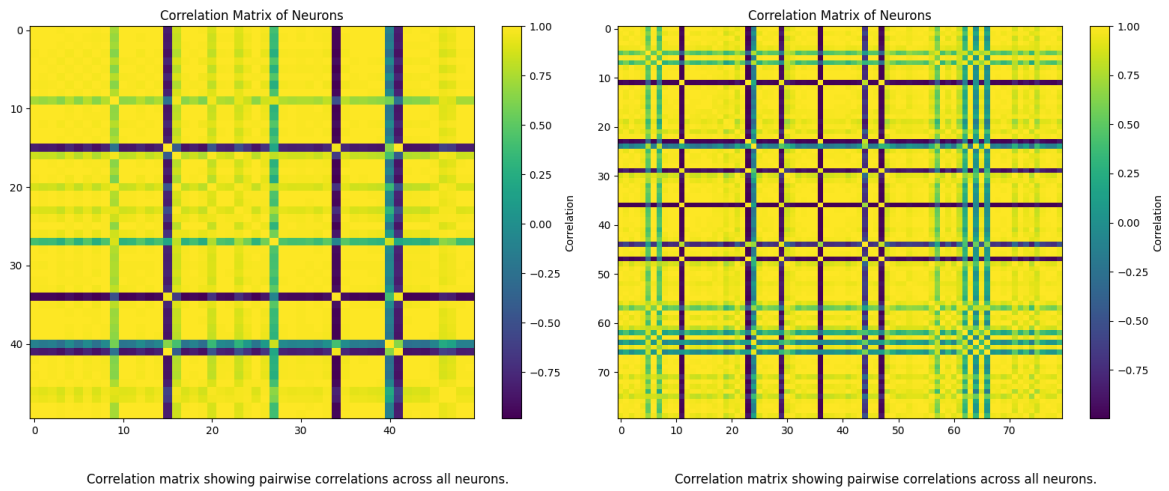
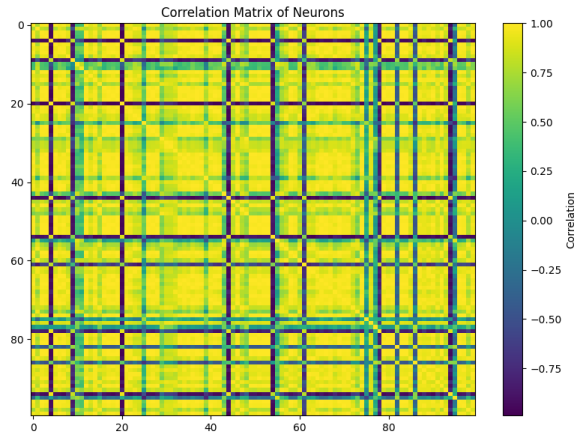
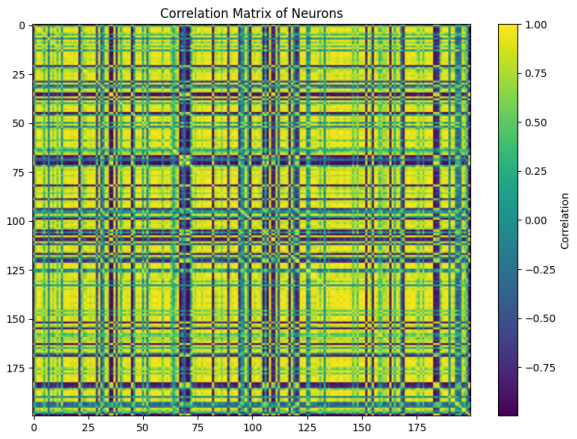


Figure 21: Correlation Matrix – 50 and 80 neurons

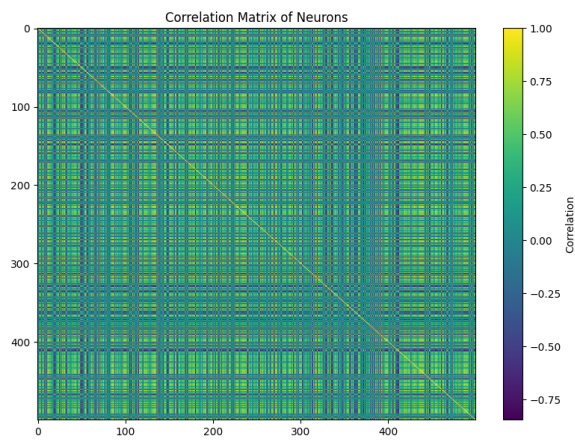


Correlation matrix showing pairwise correlations across all neurons.

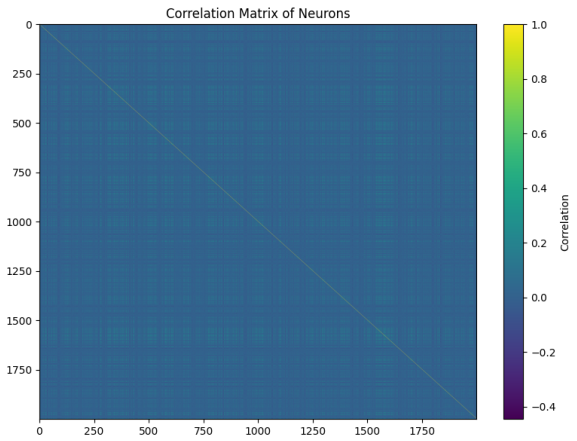


Correlation matrix showing pairwise correlations across all neurons.

Figure 22: Correlation Matrix – 100 and 200 neurons

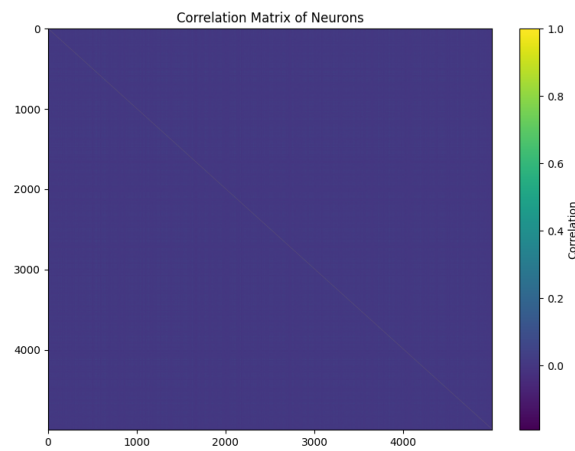


Correlation matrix showing pairwise correlations across all neurons.



Correlation matrix showing pairwise correlations across all neurons.

Figure 23: Correlation Matrix – 500 and 2000 neurons



Correlation matrix showing pairwise correlations across all neurons.

Figure 24: Correlation Matrix – 5000 neurons

Supplementary Figure S1–S7: Closed Cycles in Network Graph

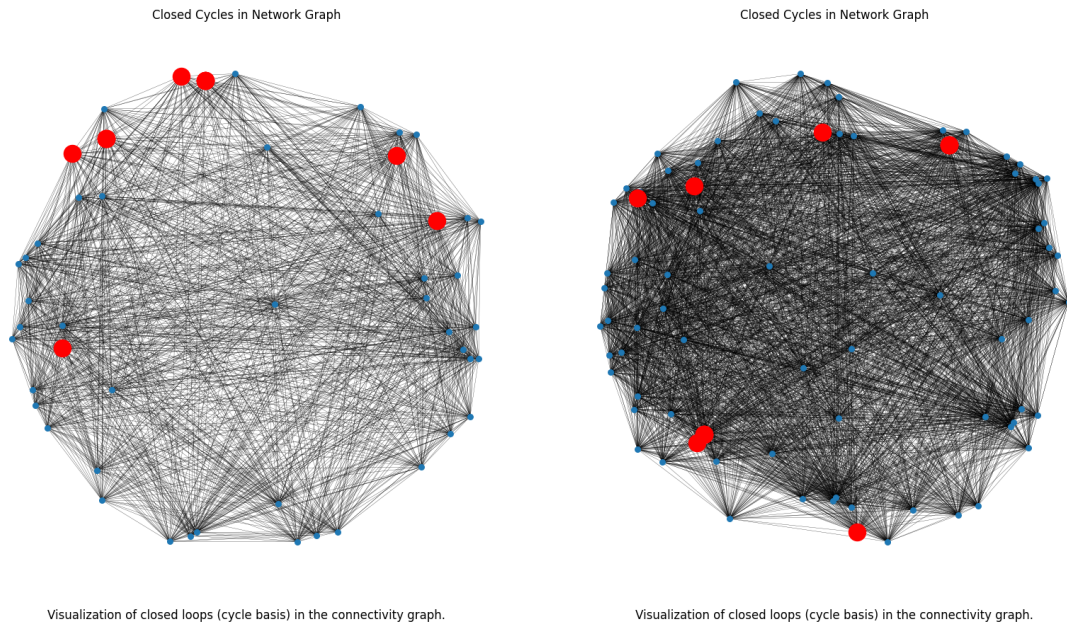


Figure 25: Closed Cycles – 50 and 80 neurons

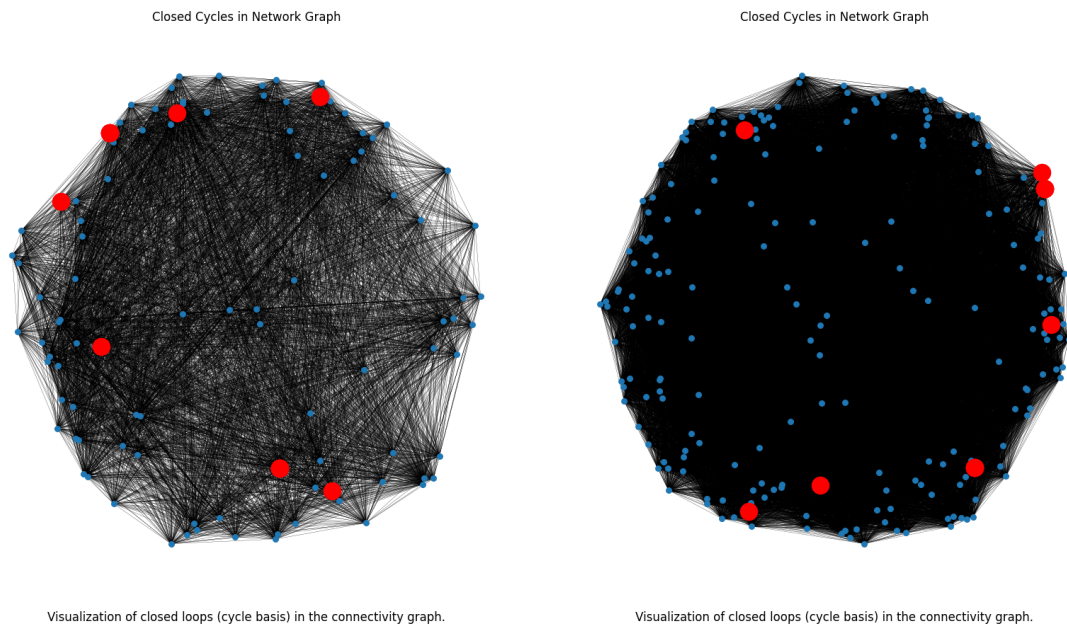


Figure 26: Closed Cycles – 100 and 200 neurons

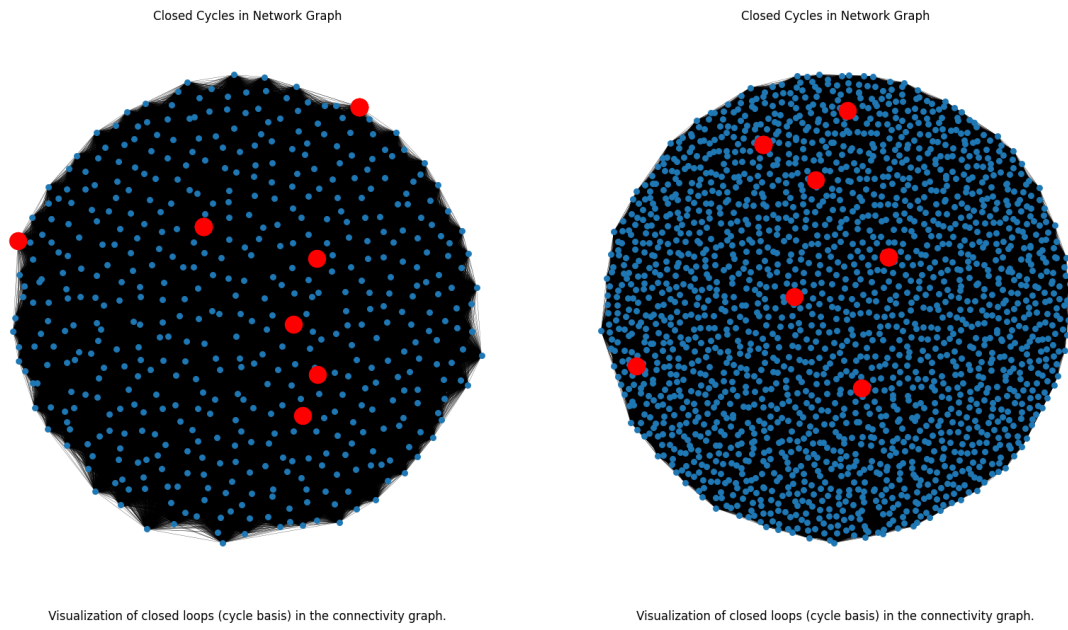


Figure 27: Closed Cycles – 500 and 2000 neurons

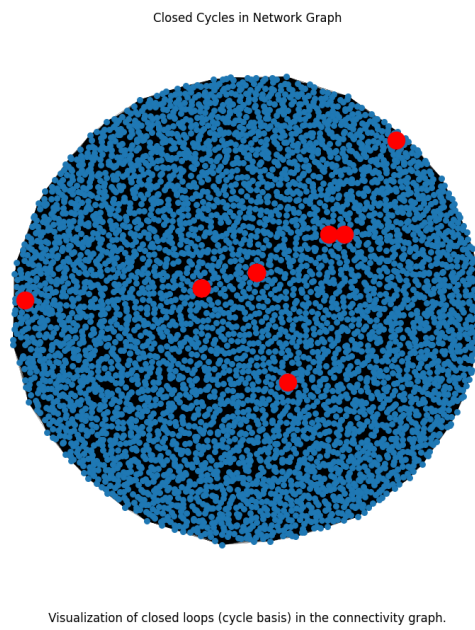


Figure 28: Closed Cycles – 5000 neurons

Supplementary Figure S1–S7: Neural Activity

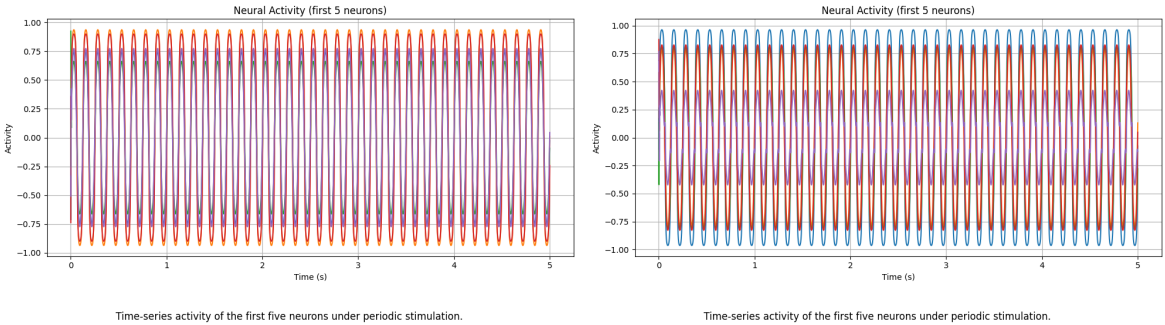


Figure 29: Neural Activity – 50 and 80 neurons

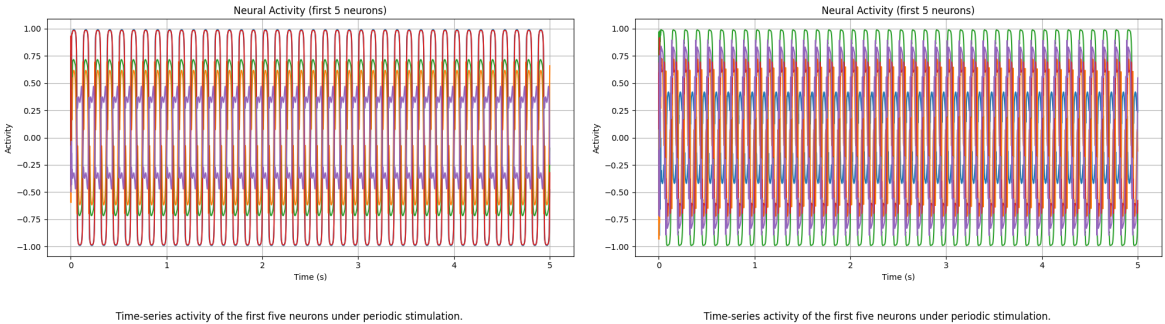


Figure 30: Neural Activity – 100 and 200 neurons

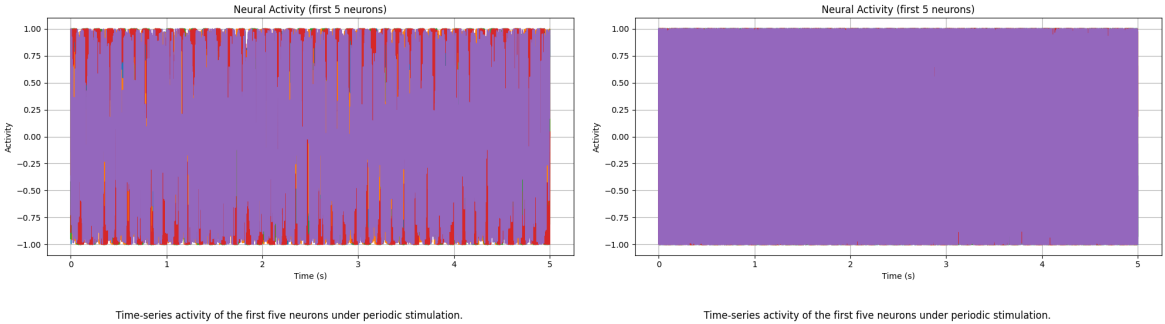
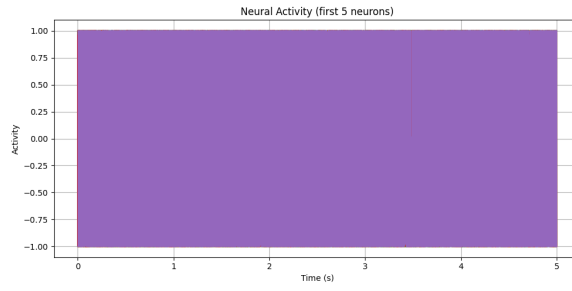


Figure 31: Neural Activity – 500 and 2000 neurons



Time-series activity of the first five neurons under periodic stimulation.

Figure 32: Neural Activity – 5000 neurons

Supplementary Figure S57: Closed Resonant Geometry

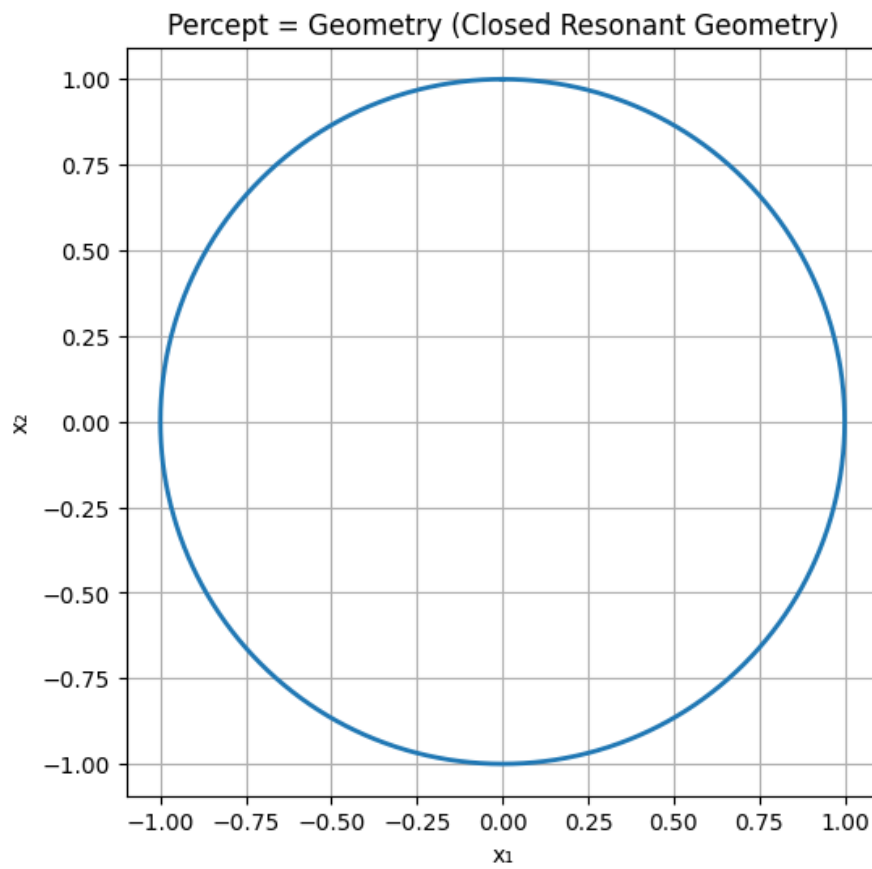


Figure 33: Closed resonant geometry illustrating the stable CRG structure.

Supplementary Figure S58: Co-Mapping of CRGs and Percepts

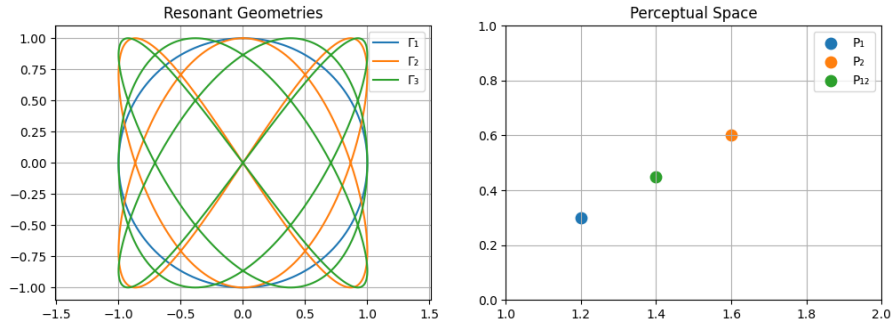


Figure 34: Co-mapping of CRGs and perceptual reports showing geometric alignment.

Supplementary Figure S59: Combined Geometry

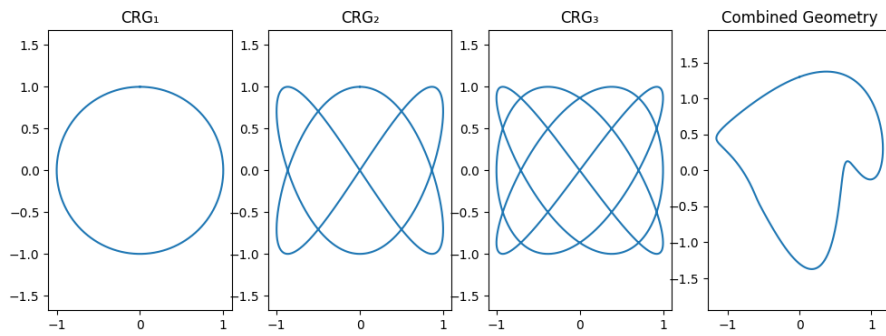


Figure 35: Combined geometry demonstrating multi-frequency resonant structure.

Supplementary Figure S60: Mapping CRGs $\rightarrow$ Perceptual Space

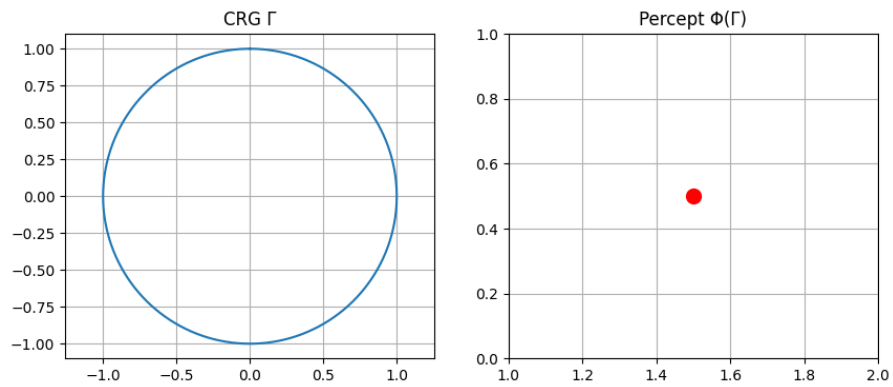


Figure 36: Mapping CRGs into perceptual space showing geometric-phenomenal correspondence.

Supplementary Figure S61: Recurrent Network $\rightarrow$ Resonant Dynamics $\rightarrow$ CRG

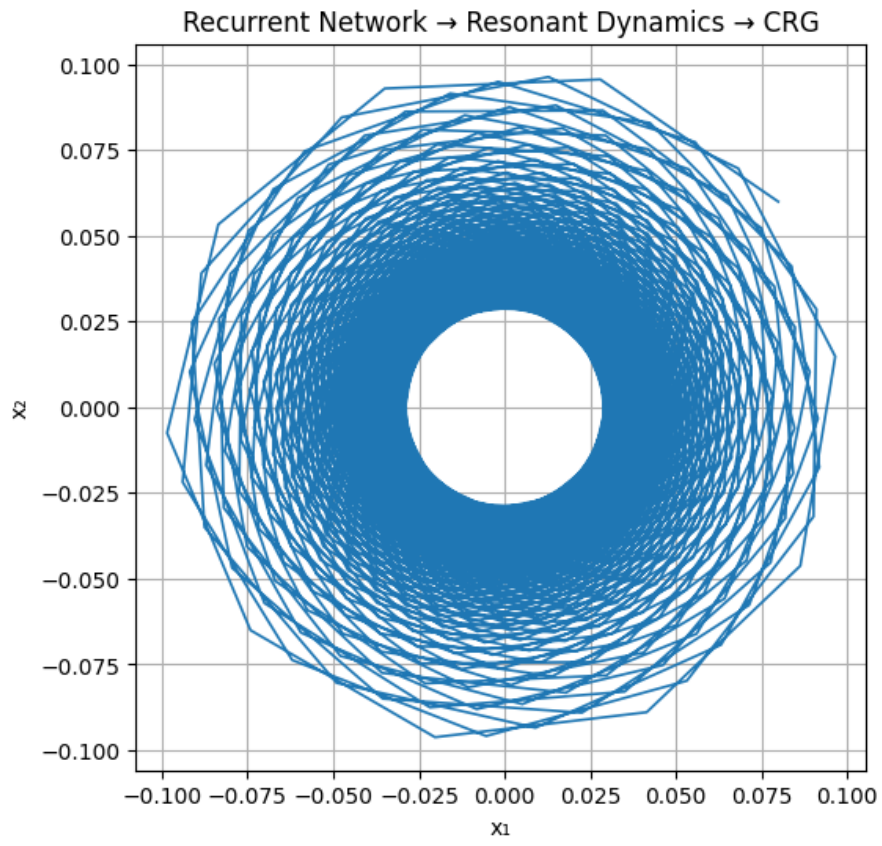


Figure 37: Pipeline from recurrent network dynamics to resonant closed geometry formation.