

I. Single neurons. Conductance-based models, modeling membrane ionic currents. Phase plane analysis of excitability. (Tutorials on dynamical systems and XPP/Auto)

- Hodgkin-Huxley model.
- Reduced models. Morris-Lecar model. Bursting.
- Integrate-and-fire. Noise.
- Modeling large networks with similar methods (rate models)
- Plasticity

II. Small networks. Coupled oscillators.

- Phase oscillators
- Phase-resetting curves

III. Neural coding. Information theory.

- Analysis of neuronal spike trains
- Measures of information