

## **Dynamics of heterogeneous networks of Winfree oscillator**

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Winfree oscillators are phase oscillator models of neurons, characterised by their phase response curve and pulsatile interaction function. We use the Ott/Antonsen ansatz to study large heterogeneous networks of Winfree oscillators, deriving low-dimensional differential equations which describe the evolution of the expected state of an oscillator.

We consider the effects of correlations between an oscillator's in-degree and out-degree, and between in- and out-degrees of an "upstream" and a "downstream" oscillator (degree assortativity). We also consider correlated heterogeneity, where some property of an oscillator is correlated with a structural property such as degree. The results give insight into the effects of the structure of a network on its dynamics.