# Mathematical Foundations of Neuroscience - Sample Questions - Lecture 13 - Coupled oscillators

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January 12, 2010

Questions marked with * are not obligatory.

1. Explain the Winfree's derivation of the phase model for coupled oscillators.

2. Explain the Kuramoto derivation of the phase model for coupled oscillators.

3. Explain the Malkin's derivation of the phase model for coupled oscillators.

4. What is a torus knot?

5. What are possible synchrony regimes of two coupled oscillators?

6. Formulate the Ermentrout's sufficient for stability of the solution of phase equation.

7. What can happened in a 2d grid of oscillators with sin coupling?

8. Assume you are flying to Japan. When should you expose yourself to the sun in order to reset your circadian rhythm? (*)