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# Multiscale Oscillations in the Olsen Model

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## Abstract

In this talk I am going to report on the geometric decomposition of nonlinear dynamics in the Olsen model. Although this model has been proposed by Olsen already in the late 1970s and has been investigated many times with different methods, a full understanding of the mechanisms that lead to oscillatory patterns was not available. Nonlinearity, several small parameters, higher-dimensionality and wide parameter ranges are the key difficulties in this context. However, using methods from the geometric theory of multiple time scale dynamical systems, it is possible to identify the main mechanisms. In particular, I am going to illustrate the main steps to prove the existence of non-classical relaxation oscillations and explain how one may deal with mixed-modes and chaotic solutions from the same viewpoint.

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