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*Bifurcation theory of the infinite-dimensional Kuramoto model.*

ABSTRACT: The Kuramoto model is a system of ordinary differential equations for describing synchronization phenomena. In this talk, a bifurcation structure of the infinite dimensional Kuramoto model is shown. For a certain non-selfadjoint linear operator, which defines a linear part of the Kuramoto model, the spectral theory based on a rigged Hilbert space is developed. Although the linear operator has an unbounded continuous spectrum on a Hilbert space, it is shown that it admits a spectral decomposition consisting of a countable number of eigenfunctions on a space of generalized functions. The results are applied to the Kuramoto model to obtain a bifurcation diagram conjectured by Kuramoto. It is proved that there exists a finite dimensional center manifold on a space of generalized functions, while a center manifold on a Hilbert space is of infinite dimensional.