Separatrix Reconnection and Meanders in the Standard Nontwist Map

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Abstract

We consider reconnection and bifurcation phenomena in nontwist area-preserving maps, such as those that model magnetic field lines in toroidal plasma devices with reversed shear profiles. The reconnection changes the phase space topology in the vicinity of the central barrier where the twist condition is violated. Its mechanism and relation to transport has been studied extensively in recent years in e.g., [1], [2], [3]. We discuss several exact methods and their numerical implementation for determining the reconnection threshold in parameter space. The reconnection of odd-period orbits gives rise to *meanders* (invariant tori that are not graphs). We demonstrate nested meander structure numerically, and discuss the idea of meander transport.

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