Rich dynamics in a model for suspension bridges

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In this talk, based on a joint work with Prof. Maurizio Garrione (Politecnico di Milano), a model for suspension bridge-type structures with piers is considered. The model encompasses a coupled dynamics involving longitudinal $u(x,t)$ and torsional $\theta(x,t)$ oscillations. Focusing the dynamics on a single specific Fourier component for both the variables, a coupled system of ODEs is obtained. For this latter system, we discuss the occurrence of a possible rich and complex dynamics, including infinitely many periodic solutions (harmonic and subharmonic), for the longitudinal time-component, when the torsional one is small. This goal is achieved by applying a rigorous analytical approach, based on the theory of linked twist maps.

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