

SEMINÁRIO DO GRUPO DE FÍSICA MATEMÁTICA

Dia 9 de Junho (sexta-feira), às 11h00, sala 6.2.33

Stability, solitons and stiffness in suspension bridges

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Abstract: We model the deck of a suspension bridge as a degenerate plate, that is, a central beam with cross sections. This model displays two degrees of freedom: the vertical displacement of the beam and the torsional angles of the cross sections. We investigate the stability of the vertical movements and we prove the existence of solitons (stable solitary waves). Under certain stiffness assumptions, we show that the solitons have a nontrivial torsional component: this appears relevant for the security since several suspension bridges collapsed due to torsional oscillations. Our conclusion is that more stiffness may lead to collapses. We confirm this conclusion by analyzing more reliable and sophisticated models.

Based on joint works with V. Benci and D. Fortunato, with E. Berchio, with G. Arioli.