

The Fermi-Pasta-Ulam Model: Periodic Solutions

Gianni Arioli ^{1,2}, Hans Koch ^{3,4}, and Susanna Terracini ^{2,5}

Abstract. We introduce two novel methods for studying periodic solutions of the FPU β -model, both numerically and rigorously. One is a variational approach, based on the dual formulation of the problem, and the other involves computer-assisted proofs. These methods are used e.g. to construct a new type of solutions, whose energy is spread among several modes, associated with closely spaced resonances.

¹ Dipartimento di Matematica, Politecnico di Milano, Piazza Leonardo da Vinci 32, 20133 Milano.

² This work was supported in part by MIUR project “Metodi variazionali ed Equazioni Differenziali Non Lineari”.

³ Department of Mathematics, University of Texas at Austin, Austin, TX 78712

⁴ This work was supported in part by the National Science Foundation under Grant No. DMS-0088935.

⁵ Dipartimento di Matematica e Applicazioni, Università di Milano Bicocca, Piazza dell’Ateneo Nuovo 1, 20126 Milano