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## A Talk at the 2nd ISNMP Conference

Bad Ems, 28 June to 4 July 2026

### Open Problems Session:

**Speaker:** Jose Francisco Gomes (IFT-Unesp, Brazil)

**Title:** *Periodic solutions for integrable hierarchies*

**Abstract:** The algebraic structure of integrable hierarchies relies on affine Lie algebras and zero curvature representations, providing a systematic dressing method for constructing soliton solutions on both zero and constant non-zero vacua. Explicitly for the prototype of the mKdV hierarchy, a third kind of solution are known to exist. These are the periodic solutions written in terms of Jacobi theta functions. Expressing quasi-periodic solutions via vertex operators remains a challenging open problem for integrable hierarchies.