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On the origin of the correspondence between classical and quantum integrable theories

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If we start from some functional relations as definition of a quantum integrable theory, then we can derive from them a linear integral equation. It can be extended, by introducing dynamical variables, to become an equation with the form of the Marchenko one. Then, we naturally derive from the latter a classical Lax pair problem. We exemplify our method by focusing on the massive version of the ODE/IM (Ordinary Differential Equations/Integrable Models) correspondence involving the classical sinh-Gordon (ShG) equation with many moduli/masses, as describing super-symmetric gauge theories and the AdS_3 strong coupling of scattering amplitudes/Wilson loops. Yet, we present it in a way which reveals its generality of application. In fact, we give some hints on how it works for spin chains.

In-person participation

Yes

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