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Short title: Accurate analytic presentation of solution for the spiked harmonic oscillator problem.

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Review text:

The name of “spike” denotes a negative-power component in the potential. Its extraordinary appeal in quantum model-building ranges from phenomenology (it cannot be switched off smoothly) to perturbation theory (one needs non-power-law expansions in general – cf. [9]). Many methods can be employed ranging from certain strict algebraic considerations (yielding, e.g., quasi-exact states – cf. [19]) till the brute force numerical solutions. In this framework, the paper under consideration applies, develops and tests the idea (cf. [51] and several previous papers by the present authors) of an analytic iterative construction of wave functions via the Riccatian non-linear rearrangement of the linear Schrödinger equation. Such a method (called quasilinearization) is shown to offer amazing numerical precision of approximants already in its second iteration.