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Quantum Spherical Pendulum

Spherical pendulum is an example of a completely integrable system with globally defined continuous action functions. Since the derivatives of actions are discontinuous, we do not have global angle variables (monodromy). Nevertheless, the quantum states of the spherical pendulum, defined by the Bohr-Sommerfeld conditions, form a 2-dimensional lattice with boundary. Operators of shifting along the generators of the lattice are well defined and lead to a full quantum theory of the spherical pendulum.