Few-body dynamics in the Faddeev's three-body equations context with and without partial-wave expansion usage

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The implementation of the integral Faddeev equations in the problems of searching for eigenstates of nuclear and exotic meson-nuclear systems, as well as in the problems of searching for cross sections of three-body reactions, is discussed. In the author's works, the Faddeev equations in integral form were used in the search for cross sections of nuclear reactions induced by neutron and deuteron on lithium isotope nuclei, as well as in the problems of meson-nuclear interactions for which meson production is carried out by high-energy gamma quanta. The approach of direct numerical integration of the Faddeev equations for the case of three bodies of different masses without the use of partial wave decomposition is described. This approach was used to find the binding energies and eigenstates of three-body nuclear systems ^{3}H, ^{3}He, and $^3_\Lambda$H. The system $\Xi^- NN$ is considered, for which three three-body channels were coupled to each other. The prospects of using the developed method in problems with a number of particles greater than three and in resonance-like kaonic systems are discussed.