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Self-Consistent-Field Method and τ-Functional Method on Group Manifold in Soliton Theory: a Review and New Results

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The maximally-decoupled method has been considered as a theory to apply an basic idea of an integrability condition to certain multiple parametrized symmetries. The method is regarded as a mathematical tool to describe a symmetry of a collective submanifold in which a canonicity condition makes the collective variables to be an orthogonal coordinate-system. For this aim we adopt a concept of curvature unfamiliar in the conventional time-dependent (TD) self-consistent field (SCF) theory. Our basic idea lies in the introduction of a sort of Lagrange manner familiar to fluid dynamics to describe a collective coordinate-system. This manner enables us to take a one-form which is linearly composed of a TD SCF Hamiltonian and infinitesimal generators induced by collective variable differentials of a canonical transformation on a group. The integrability condition of the system read the curvature C=0. Our method is constructed manifesting itself the structure of the group under consideration. >...

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