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<https://doi.org/10.1142/S0217732319501104> | Cited by: 8 (Source: Crossref)

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## Abstract

We propose a new form of Lagrangian that shows branching for the associated Hamiltonian and has relevance to the quadratic type and mixed linear-quadratic Liénard-type nonlinear dynamical equations on adjusting the underlying parameters. Non-uniqueness of the Lagrangian is pointed out and a particular one when Fourier transform is demonstrated to depict a momentum-dependent quantum-like mass system when expanded binomially.

**Keywords:** Branched Hamiltonian - nonstandard Lagrangian

**PACS:** 03.65.Fd, 11.30.-j, 04.60.Nc, 04.60.Pp

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