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RELATIONSHIP BETWEEN THE HAMILTONIAN AND LAGRANGIAN PERTURBATION THEORIES

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The Hamiltonian and Lagrangian perturbation theories are identical in a quantum theory with non-derivative interaction terms. However, the interaction terms in these theories differ if they contain time-derivatives. A very important example with interaction terms with time derivatives is perturbative quantum gravity. In this talk I point out that the two perturbation theories are equivalent, as they should be, despite the difference in their interaction terms because the time-derivative acts on the propagator differently in these two perturbation theories.