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Michael A Maroun* (mmaro001@ucr.edu). *The Rigorous Feynman Path Integral, Analytic Continuation and Convolution as Generalized Evolution.*

I present a brief outline of the investigation of the mathematically rigorous Feynman Path Integral (FPI) and its applications to physical systems. The formalism is equivalent to the Schrodinger Unitary time evolution when certain generalized methods of integration are employed including but not limited to analytic continuation. However, the FPI formalism extends the unitary evolution to more general time evolutions through contraction semi-groups. The FPI also gives an explicit convolution form for the Feynman quantum propagator through the Trotter Product formula. The form of the potentials can be generalized to include measures and distributions. The mathematical forms and physical significances of the generalized potentials are summarized in the contexts of multi-particle systems. Their implications and possible applications to Quantum Field Theory are also discussed. (Received September 15, 2009)