1096-81-2227 **Fabiano M. Andrade*** (fmandrade@uepg.br), Dep. de Matemática e Estatística, Ponta Grossa, 84030900. *Green's function approach for quantum walks.*

Quantum walks are the quantum version of the classical random walks and constitute important tools in different applications, especially in quantum algorithms. A key aspect to explain different phenomena observed in quantum walks is the interference. So a description emphasizing the pathlike character of quantum walks is desirable. In this manner Green's function approach is particularly useful and is developed in this work. The exact formula has the form of a sum-over-paths and always can be cast into a closed analytic expression for arbitrary graph topologies and position-dependent quantum amplitudes. To a great extent the quantum walks usefulness is due to unusual diffusive features, allowing much faster spreading than their classical counterparts. Such behavior, although frequently credited to intrinsic quantum interference, usually is not completely characterized. Using the Green's function approach the problem dynamics in terms of a true Feynman sum-over-paths history is described. This allows one to explicitly identify interference effects and also to explain the emergence of superdiffusivity. (Received September 17, 2013)