1035-60-252 **Erhan Bayraktar*** (erhan@umich.edu), Department of Mathematics, 530 Church Street, Ann Arbor, MI 48109. *On the Finite Time Horizon American Put Option for Jump Diffusions: A Smoothness Proof and an Exponentially Fast Algorithm.*

We give a new proof of the fact that the value function of the finite time horizon American put option for a jump diffusion, when the jumps are from a compound Poisson process, is the classical solution of a quasi-variational inequality and it is C^1 across the optimal stopping boundary. Our proof only uses the classical theory of parabolic partial differential equations of [**?**] and does not use the *the theory of vicosity solutions*, since our proof relies on constructing a sequence of functions, each of which is a value function of an optimal stopping time for a *diffusion*. The sequence is constructed by iterating a functional operator that maps a certain class of convex functions to smooth functions satisfying variational inequalities (or to value functions of optimal stopping problems involving only a diffusion). The approximating sequence converges to the value function exponentially fast, therefore it constitutes a good approximation scheme, since the optimal stopping problems for diffusions can be readily solved. (Received August 24, 2007)