

We propose a Monte Carlo filter for recursive estimation of diffusive processes that modulate the instantaneous rates of Poisson measurements. A key aspect is the additive update, through a gain-like correction term, empirically approximated from the innovation integral in the time-discretized Kushner-Stratonovich equation. The additive filter-update scheme eliminates the problem of particle collapse encountered in many conventional particle filters. Through a few numerical demonstrations, the versatility of the proposed filter is brought forth.