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# On time-inconsistent stopping problems and mixed strategy stopping times

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## Abstract

A game-theoretic framework for time-inconsistent stopping problems where the time-inconsistency is due to the consideration of a non-linear function of an expected reward is developed. A class of mixed strategy stopping times that allows the agents in the game to choose the intensity function of a Cox process is introduced. A subgame perfect Nash equilibrium is defined. The equilibrium is characterized and other results with different necessary and sufficient conditions for equilibrium are proven. This includes a smooth fit result. A mean-variance problem and a variance problem are studied as examples. The state process is a general one-dimensional Itô diffusion.

*Keywords:* Conditional Poisson process, Cox process, Equilibrium stopping time, Mean-variance criterion, Mixed strategies, Optimal stopping, Subgame perfect Nash equilibrium, Time-inconsistency, Variance criterion.

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