

Optimal Stopping under Model Uncertainty in a General Setting

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Abstract:

Abstract: We consider the optimal stopping time problem under model uncertainty $R(v) = \sup_{\mathbb{P} \in \mathcal{P}} \sup_{\tau \in \mathcal{S}} E^{\mathbb{P}}[Y(\tau) | \mathcal{F}_v]$, for every stopping time v , in the framework of families of random variables indexed by stopping times. This setting is more general than the classical context of processes. Under weaker integrability and regularity assumptions of the reward family $(Y(v), v \in \mathcal{S})$, we show the existence of an optimal stopping time. We then proceed to find necessary and sufficient conditions for the existence of an optimal model. To this end, we provide a universal Doob-Meyer-Merten's decomposition for the generalized Snell envelope family. This decomposition is then used to study the properties of the optimal probability model.