Sequential $\boldsymbol{\varepsilon}$-Contamination with Learning*

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Abstract

The ε-contamination has been studied extensively as a convenient and operational specification of Knightian uncertainty. However, it is formulated in a static, one-shot economic environment. This paper extends this concept into a dynamic and sequential framework, allowing learning and guaranteeing time consistency of intertemporal decision. We develop the theory of the *rectangular* $\boldsymbol{\varepsilon}$-contamination, which can be represented by a sequence of ε's that "contaminates" the conditional principal probability measure. We then compare this sequential (thus closed-loop) rectangular $\boldsymbol{\varepsilon}$-contamination with the initial-period one-shot (thus open-loop) ε-contamination, which is a straightforward extension of the static ε-contamination.

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