

# Variational Convergence and their Applications to Statistics and Econometrics

## 変分収束とその統計学・計量経済学への応用

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### Abstract

This study concerns the variational convergence and their applications to statistics, econometrics and economics. Elucidating the relationship between the variational inequalities, free-boundary problem, the optimal stopping problem and the Dirichlet form, we confirm that many problems involved in statistics, econometrics and economics result in the variational inequalities. We also consider the empirical convergence of the variational inequalities. Examples including the threshold models and the  $q$  models of investment in conjunction with the free-boundary problem, the sequential tests and the change point detection in relation to the optimal stopping problem, a non-linear cointegrating regression and admissible estimator relative to the Dirichlet form and quantile regression and density estimation concerned with the variational inequalities are stated.

変分収束とその統計学・計量経済学・経済学への応用を述べる。変分不等式と、自由境界問題、最適停止問題、及び2次形式との関係を明らかにして、統計学・計量経済学・経済学のさまざまな問題が変分不等式へ帰着できることをしめす。また実証の際の変分不等式の empirical な収束の問題も扱う。ここで扱われる具体的問題として、閾値モデルと投資関数推定問題が自由境界問題との関連で、また逐次検定問題と変化点検定問題が最適停止問題との関連で、非線形共和分回帰と統計的推定の許容性が2次形式との関連で、分位点回帰と密度推定が変分不等式との関連で、それぞれ述べられる。