

Causality, optional and predictable projections

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Abstract. We consider statistical concept of causality between filtrations in continuous time which is based on Granger's definition of nonlinear causality [2]. It will be shown that the given concept of causality [1, 3] preserves some of the important properties of stochastic process when the filtration is getting larger, such as martingale, optional and predictable property.

Optional and predictable projections of stochastic processes are two important concepts in the general theory of stochastic process; they are closely related to ordinary and generalized conditional expectations. The connections between the given causality concept and the optional projection and the predictable projection of the stochastic process will be presented [4]. Some of the results show that the (self-)causality implies indistinguishability of the optional (or predictable) projections with respect to the considered filtrations from the ones with respect to the larger filtrations [4].

Keywords: Granger's causality; stochastic processes with continuous parameter, filtrations, optional projection, predictable projection

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