

**October 20, 2023 (Friday)**  
**3:30pm-4:30pm**  
**KAP 414**

**Prof. Cagin Ararat**  
**(Bilkent University, Turkey)**

Path-regularity and martingale properties of set-valued stochastic integrals

**Abstract:** We study the path-regularity and martingale properties of set-valued stochastic integrals defined in our previous work A., Ma, Wu (AAP, 2023). Such integrals are fundamentally different from the well-known Aumann-Itô stochastic integrals and more suitable for representing set-valued martingales. However, like the Aumann-Itô integral, the new integral is only a set-valued submartingale in general, and there is very limited knowledge about its path-regularity. We first establish the existence of right- and left-continuous modifications of set-valued submartingales in continuous time and apply these results to set-valued stochastic integrals. We also show that a set-valued stochastic integral yields a martingale if and only if the set of terminal values of the stochastic integrals associated to the integrand is closed and decomposable. As a special case, we study the set-valued martingale in the form of the conditional expectation of a convex set-valued random variable. When this random variable is a convex random polytope, we show that the conditional expectation of a vertex stays as a vertex of the set-valued conditional expectation if and only if the random polytope has a deterministic normal fan. This is a joint work with Jin Ma.

**Zoom Link:** USC Math Finance Colloquium

Join Zoom Meeting

<https://usc.zoom.us/j/94973619069?pwd=VnU5bVlMc1pzVTlEYUVaZUYyNSt6UT09>

Meeting ID: 949 7361 9069

Passcode: 925028