# ISTANBUL KÜLTÜR UNIVERSITY
# DEPARTMENT OF INDUSTRIAL ENGINEERING

## SEMINAR SERIES

**Forecasting International Migration Based on a Hybrid Fuzzy and Bayesian Method**

By

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Abstract:

Forecasting international migration is one of the vital elements in demographic analysis since it plays a significant role in shaping the socio-economic structures of countries. The current interest in forecasting migration has led to several migration theories as well as deterministic and stochastic forecasting methods. These methods are based on strict subjective or statistical assumptions which may not always be met. Moreover, the exact values of migrants are seldom known due to data recording and collection errors; thus, there is a significant amount of vagueness and uncertainty in migration data. In this study, to deal with the uncertainties in migration values, a hybrid method integrating fuzzy set theory and Bayesian forecasting is proposed for forecasting age-specific migration. The proposed method models the observed migration values via fuzzy regression, singular value decomposition, and an unconstrained nonlinear optimization model through a bi-level structure; and forecasts the future fuzzy migration values using Bayesian time series models. The proposed method is applied on emigration and immigration data of Finland, in which annual age-specific migration values for 2011-2025 are forecasted using the fuzzy estimates for 1990-2010. The results are compared with the outputs of an existing Bayesian migration forecasting method and the numerical findings display that the proposed hybrid method is superior to the existing one in forecasting age-specific migration values within significantly narrower prediction intervals.

All interested are cordially invited.

Date : April 5, 2019

Time : 10:30 – 11:30

Room : 2. Kat Seminer Salonu