

**Abstract:** In this presentation, we consider weak factor (WF) models. First, we formally introduce the WF models and explain the importance in view of the real data. Second, when the WF model is induced by the sparsity of the factor loadings under a specific rotation, we present a more efficient estimator, called the SOFAR (sparse orthogonal factor regression) estimator, compared to the commonly used PC (principal component) estimator. Third, we propose an inferential method to uncover the sparsity pattern in the loading matrix based on the false discovery rate control. Finally, we show our recent development on the rotation in the WF models and asymptotic theory for the PC estimator.