

PS1: Nonstationary Rainfall Frequency Analysis (Due Oct 6)

Houston Daily Rainfall Extremes and Climate Change

CEVE 543 Fall 2025

2025-08-27

1 Tasks

1. Fit stationary GEV model to Houston Hobby station data using MLE and Bayesian approaches
2. Assess nonstationarity evidence using rolling window analysis and Mann-Kendall test; repeat for 5 nearby stations to identify spatial patterns
3. Compare station-level analyses to identify which locations show strongest trends and evaluate consistency across the region
4. Fit nonstationary GEV model with time-varying location parameter; choose and defend covariate selection (year vs. temperature indices)
5. Implement regional partial pooling across all stations using hierarchical Bayesian model to improve parameter estimates
6. Address stakeholder concerns: In 2 paragraphs, explain how you would respond to a senior engineer who is skeptical about using climate-informed design values instead of stationary historical analysis

Bibliography