Maria Panagiota Fourtouni – Academic Projects Portfolio

Survival Analysis & Reliability

• Kaplan–Meier Estimation & Log-Rank Tests — Applied survival analysis methods on lung cancer dataset, including Kaplan–Meier estimation, log-rank and Wilcoxon tests, and model comparison (PH vs AFT models).

• Censored Data Modeling — Log-normal regression with right-censored data, derivation of likelihood, and implementation in R.

• Pareto Distribution & Hazard Functions — Theoretical derivations and proofs in reliability context.

Statistical Quality Control (SQC)

• p-Charts for Defect Analysis — Constructed control charts for defect rates in manufacturing processes, re-estimated limits after removing special causes (R implementation).

• EWMA Control Charts — Built and interpreted EWMA charts to detect small process shifts.

• Process Capability Indices — Evaluated Cp, Cpk indices for printed circuit thickness, with X-bar and R charts.

Probability Theory & Stochastic Processes

• Theoretical Proofs — Exercises in measure-theoretic probability, uniform integrability, monotone convergence, and random variable limits.