Sta 532: Homework #2

1. Let $\{X_1, \cdots, X_n\} \overset{\text{iid}}{\sim} F(x)$ and consider the empirical CDF $\hat{F}_n(x)$. For each x find the exact probability distribution of $n\hat{F}_n(x)$ and, using the central limit theorem, the approximate distribution of $\sqrt{n}[\hat{F}_n(x) - F(x)]$.

2. For $-\infty < x < y < \infty$, find the covariance $\mathsf{Cov}[\hat{F}_n(x), \hat{F}_n(y)]$.

3. Download the Fiji earthquake data from the text's website
   http://www.stat.cmu.edu/∼larry/all-of-statistics/
   (also available from the course home page). Evaluate and plot the empirical CDF $\hat{F}_n$ for the quake magnitudes (fifth column), along with a 90% uniform confidence envelope for F.

4. Using the same Fiji earthquake data, find an approximate 90% confidence interval for $[F(5.0) - F(4.5)]$, the fraction of quakes whose magnitude is in the range $(4.5, 5.0]$.

5. What is the sample median of the Fiji earthquake magnitudes?

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