Conditional probability and Bayes’ Rule

\[ P(A|B) = \frac{P(A \cap B)}{P(B)} \]

\[ P(M|D) = \frac{P(D|M) \cdot P(M)}{\sum_{i=1}^{k} P(D|M_i) \cdot P(M_i)} \]

Single Normal Sample

\[ \mu_{\text{box}} \] is approx \( t(df) \) with
\[ df = n - 1 \]
\[ \mu = \bar{x} \]
\[ \sigma = \text{sem} = \frac{s}{\sqrt{n}} \]

Single Bernoulli Rate

\[ \mu = \hat{p} = \frac{x}{n}, \quad x = \text{successes}, \quad n = \text{trials} \]
\[ \sigma = \text{sep} = \sqrt{\frac{\hat{p} \cdot (1-\hat{p})}{n}} \]

Relative Risk

\[ \ln(RR) \] is approximately normal with
\[ \mu = \ln(RR) \]
\[ \sigma = \frac{\ln(UCL)}{LCL} \]
\[ \frac{2 \cdot 1.96}{} \]

Multiple Linear Regression

\[ \hat{y} = \beta_1 \cdot x_1 + \cdots + \beta_k \cdot x_k \]
\[ \beta_i \] is approximately \( t(df) \) with
\[ \mu = \hat{\beta}_i \]
\[ \sigma = \text{seb} \]

Kaplan-Meier:

<table>
<thead>
<tr>
<th>Interval</th>
<th>at Risk</th>
<th>Failed</th>
<th>Censored</th>
<th>Failure Rate</th>
<th>Survival Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>previous</td>
<td>A</td>
<td>F</td>
<td>C</td>
<td>R = F/A</td>
<td>S</td>
</tr>
<tr>
<td>next</td>
<td>a=A-F-C</td>
<td>f</td>
<td>c</td>
<td>r = f/a</td>
<td>S \cdot (1 - r)</td>
</tr>
</tbody>
</table>

Decision Analysis by Backward Induction:

Working right to left:
- Replace each stochastic node with its expected value.
- Replace each decision node with the cost of the lowest cost decision.