P8110 Homework Two

Nick Williams
ntw2117

Problem 1

(a)

$$\hat{t_{0.5}} = \min\{t_j : \hat{S}(t_j) < 0.5\}$$

1: identify $\hat{t_j}$ such that $\hat{S}(t_j) < 0.5$

t_j	surv_prob
t_6	0.0000
t_5	0.2667
t_4	0.4000

2: identify minimum $\hat{t_j} : \hat{t_4} = 5$

$$
\begin{aligned}
95\%\text{CI} &= \text{all } t_j\text{CI} \ni 0.5 \\
&= t_1, t_2, t_3, t_4, t_5 \\
&= [0.4, 1.2), [1.2, 4.3), [4.3, 5.0), [5.0, 5.1), [5.1, 7.1) \\
&= [0.4, 7.1)
\end{aligned}
$$

We estimate that 50% of patients will survive for more than 5 years. Furthermore, we are 95% confident that the true median survival time is between 0.4 and 7.1 years.