Problem 14.1

Problem 14.1.2

Assuming priors of the form: $\pi \sim beta(\alpha_\psi, \beta_\pi), S \sim beta(\alpha_S, \beta_S)$ and $C \sim beta(\alpha_C, \beta_C)$, it is possible to code up a Gibbs sampler for this problem [8] of the form

$$Y_1 | a, \pi, S, C \sim \mathcal{B}\left(a, \frac{\pi S}{\pi S + (1 - \pi)(1 - C)}\right) \tag{14.3}$$

$$Y_2 | b, \pi, S, C \sim \mathcal{B}\left(b, \frac{\pi(1 - S)}{\pi(1 - S) + (1 - \pi)C}\right) \tag{14.4}$$

$$\pi | a, b, Y_1, Y_2 \sim beta\left(Y_1 + Y_2 + \alpha_\pi, a + b - Y_1 - Y_2 + \beta_\pi\right) \tag{14.5}$$

$$S | Y_1, Y_2 \sim beta\left(Y_1 + \alpha_S, Y_2 + \beta_S\right) \tag{14.6}$$

$$C | a, b, Y_1, Y_2 \sim beta\left(b - Y_2 + \alpha_C, a - Y_1 + \beta_C\right) \tag{14.7}$$

Figure 1: equations