Bayesian Reliability Simulation

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$$\lambda_{rj} = \alpha_{r0} \exp(\alpha_{r1} w_j)$$

```r
alpha = matrix(c(0.001, 0.05, 0.0001, 0.08), ncol = 2, byrow = TRUE)
w = c(45, 55)
t = matrix(seq(10, 40, 10), ncol = 2, byrow = TRUE)
K = c(10, 50, 100)


lambda = function(r = 1:2, j = 1:2) {
  alpha_r0 = alpha[r, 1]
  alpha_r1 = alpha[r, 2]
  return(alpha_r0*exp(alpha_r1*w[j]))
}


p = function(i = 1:2, j = 1:2){
  lam1j = lambda(1, j)
  lam2j = lambda(2, j)

  p0 = exp(-(lam1j + lam2j)*t[i, j])
  p1 = (lam1j/(lam1j + lam2j))*(1 - p0)
  p2 = (lam2j/(lam1j + lam2j))*(1 - p0)

  return(c(p0, p1, p2))
}


rmultinom(100, K[1], prob = p(1, 1))
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10] [,11] [,12] [,13]
## [1,]    8    8   10    9   10   10    9    7    9     9    10     9     9
## [2,]    2    2    0    0    0    0    1    3    1     1     0     1     1
## [3,]    0    0    0    1    0    0    0    0    0     0     0     0     0
##      [,14] [,15] [,16] [,17] [,18] [,19] [,20] [,21] [,22] [,23] [,24]
## [1,]    10     8    10     9     9     8    10     8     8    10     7
## [2,]     0     2     0     1     0     2     0     2     1     0     3
## [3,]     0     0     0     0     1     0     0     0     1     0     0
##      [,25] [,26] [,27] [,28] [,29] [,30] [,31] [,32] [,33] [,34] [,35]
## [1,]     8     9    10     8    10     8     9     7     8     9     9
## [2,]     1     1     0     2     0     2     1     2     1     1     1
## [3,]     1     0     0     0     0     0     0     1     1     0     0
##      [,36] [,37] [,38] [,39] [,40] [,41] [,42] [,43] [,44] [,45] [,46]
## [1,]    10     9     7    10     9     8    10     7    10     7     9
## [2,]     0     0     2     0     0     2     0     3     0     2     1
## [3,]     0     1     1     0     1     0     0     0     0     1     0
##      [,47] [,48] [,49] [,50] [,51] [,52] [,53] [,54] [,55] [,56] [,57]
## [1,]    10     8    10     9     9     9     8    10     6     8     7
## [2,]     0     2     0     0     0     1     2     0     4     2     1
```

```
## [3,]     0     0     0     1     1     0     0     0     0     0     2
##        [,58] [,59] [,60] [,61] [,62] [,63] [,64] [,65] [,66] [,67] [,68]
## [1,]    10     7    10    10     9     8     9    10    10    10    10
## [2,]     0     2     0     0     1     1     1     0     0     0     0
## [3,]     0     1     0     0     0     1     0     0     0     0     0
##        [,69] [,70] [,71] [,72] [,73] [,74] [,75] [,76] [,77] [,78] [,79]
## [1,]     9    10    10     7    10     9     9     9    10     9     8
## [2,]     0     0     0     2     0     1     0     0     0     1     2
## [3,]     1     0     0     1     0     0     1     1     0     0     0
##        [,80] [,81] [,82] [,83] [,84] [,85] [,86] [,87] [,88] [,89] [,90]
## [1,]     9     9     7    10     9     9     8     8     9     9     8
## [2,]     1     1     1     0     1     1     1     2     0     0     1
## [3,]     0     0     2     0     0     0     1     0     1     1     1
##        [,91] [,92] [,93] [,94] [,95] [,96] [,97] [,98] [,99] [,100]
## [1,]     9     9    10     4     8     9     9     8    10      9
## [2,]     1     1     0     4     1     1     0     2     0      0
## [3,]     0     0     0     2     1     0     1     0     0      1
```

```
rjeliab = '
data {

}
parameters{
  real<lower=0> a10;
  real<lower=0> a11;
  real<lower=0> a20;
  real<lower=0> a21;
}
model{
  t ~ nhpp(beta, theta, tau);
//PRIORS
  a10 ~ gamma(1, 1);
  a11 ~ gamma(1, 1);
  a20 ~ gamma(1, 1);
  a21 ~ gamma(1, 1);
}
'
```