

KEVLAR FIXED EFFECTS INFORMATIVE LOGNORMAL PRIOR II

```
#####
##### This program represents the collaborative efforts of Dr. Ramon Leon, #####
##### Jayanth Thyagarajan, and Avery Ashby. This is an inclusive odc file #####
##### containing the model, data, and initial values. March 20, 2002. #####
#####
```

```
#####
##### MODEL #####
#####
```

```
model KevlarFixedEffectsLognormalPrior1to2;
{
```

```
##### This loop creates prior values for spools 1 through 7 #####
```

```
for(i in 1:N - 1) { # N is the number of spools (8)
  b[i] ~ dnorm(0,0.001) # Fixed effect of spool
}
##### End of loop #####
#####
```

```
##### Method of dealing with last spool effect #####
```

```
b[8] <- 0 # Eighth spool set to zero effect
intercept ~ dnorm(0,0.001) # Intercept prior
#####
```

```
##### Generation of other prior values #####
```

```
beta.stress ~ dnorm(0,0.001) # Fixed stress effect
#####
```

```
##### Creates a lognormal prior for the shape parameter of the Weibull #####
##### where most certainly (Beta) is between 1 and 2 #####
```

```
anot <- -0.3466
mu <- anot * -1
bnot <- 0.1345
tau <- pow(bnot,-2) # tau = 1/(bnot^2)
r ~ dlnorm(mu,tau) # Weibull shape parameter
#####
```

```
##### This loop reads in the data and calculates Weibull scale parameter #####
```

```
for(j in 1:M) { # M is the number of rows in the data (108)
  log(eta[j]) <- intercept + beta.stress * log(stress[j]) + b[spool[j]] # This is the function for mu in the Weibull
  lambda[j] <- pow(eta[j],-r) # Rescale into lambda parameterization
} # for use in winBUGS 1.4
##### End of loop #####
#####
```

```
##### This loop defines failure times as exact or censored #####
```

```
for(j in 1:M) {
  t[j] ~ dweib(r,lambda[j])(cen[j],) # Failure times are Weibull or censored
```



```
t = c(2.2,4.4,4.6,6.1,6.7,7.9,8.3,8.5,9.1,10.2,12.5,13.3,14,14.6,15,
      18.7,22.1,45.9,55.4,61.2,87.5,98.2,101,111.4,144,158.7,243.9,
      254.1,444.4,590.4,638.2,755.2,952.2,1108.2,1148.5,1569.3,
      1750.6,1802.1,19.1,24.3,69.8,71.2,136,199.1,403.7,432.2,453.4,
      514.1,514.2,541.6,544.9,554.2,664.5,694.1,876.7,930.4,1254.9,
      1275.6,1536.8,1755.5,2046.2,6177.5,225.2,503.6,1087.7,1134.3,
      1824.3,1920.1,2383,2442.5,2974.6,3708.9,4908.9,5556,6271.1,
      7332,7918.7,7996,9240.3,9973,11487.3,11727.1,13501.3,14032,
      29808,31008,4000,5376,7320,8616,9120,14400,16104,20231,
      20233,35880,NA,NA,NA,NA,NA,NA,NA,NA,NA,NA,NA))
```

```
##### End of data #####
#####
```

```
#####
##### INITIAL VALUES #####
#####
```

```
list(intercept = 84.1, beta.stress = -23.1, r = 1.21) # initial values based on Crowder et al. (1991)
list(intercept = 1, beta.stress = -1,r = 1)
```

```
##### End of initial values #####
#####
```