Modeling 101-A: A Wiener process

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```
#library(RWiener)

#Y <- rwiener(1000,alpha=100,delta=1,tau=1,beta = 0.5)
#hist(Y$q, breaks=20)
```

Load the data

```
datos <- read.csv("../00_RawMaterial/datos.csv")
rt.0 <- which(datos$rt==0)
datos <- datos[-rt.0,]

I <- length(unique(datos$subID))
J <- length(unique(datos$cond))
N <- nrow(datos)

RT <- datos$rt/1000
C <- datos$resp

task <- rep(2,N)
task[datos$cond=="control"] <- 1

sub <- as.numeric(datos$subID)

Y<-RT
Y[C==0] <- -RT[C==0]
```

The model

$$Y = (Choice, RT)$$

$$Y_{ijk} \sim \text{Wiener}(\alpha_j, \tau_j, \beta_j, \delta_j)$$

with uninformative priors:

$$
\begin{aligned}
\alpha_j &\sim \text{Uniform}(0, 100) \\
\tau_j &\sim \text{InverseGamma}(0.5, 0.5) \\
\beta_j &\sim \text{Uniform}(0, 1) \\
\delta_j &\sim \text{Normal}(0, 20)
\end{aligned}
$$

where:

α	Threshold separation	$\alpha > 0$
τ	Non-decision time	$\tau > 0$
β	Bias towards "Yes"	$0 < \beta < 1$
δ	Drift rate	$\delta \sim \text{Normal}(0, 1)$

```
write('
model {
  for (i in 1:N) {
    Y[i] ~ dwiener(alpha,tau,beta,delta)
  }
  alpha ~ dunif(-5,5)
  tau ~ dunif(0,1)
  beta ~ dunif(0,1)
  delta ~ dunif(-5,5)
}',  'wiener00.txt')
```

```
dat <- list(Y=Y,N=N)
inits <- list(alpha=1,tau=0.001,beta=0.5,delta=0)
model <- jags.model("./wiener00.txt",data=dat,inits=inits,n.chains=1,n.adapt=0)
```

```
## Compiling model graph
##    Resolving undeclared variables
##    Allocating nodes
## Graph information:
##    Observed stochastic nodes: 2157
##    Unobserved stochastic nodes: 4
##    Total graph size: 2166
##
## Initializing model
```

```
samples <- jags.samples(model,c("alpha","tau","beta","delta"),n.iter=1000,thin=1)
```

```
## NOTE: Stopping adaptation
```

```
alpha <- samples$alpha[,,]
beta <- samples$beta[,,]
delta <- samples$delta[,,]
tau <- samples$tau[,,]
```

```
par(mfrow=c(2,2))
plot(density(alpha), xlim=c(2.6,3), lwd=2, col="green4", main=expression(paste(alpha)),cex.main=3)
plot(density(beta), xlim=c(0.45,0.65), lwd=2, col="indianred1", main=expression(paste(beta)),cex.main=3)
plot(density(delta), xlim=c(-0.35,0), lwd=2, col="orange4", main=expression(paste(delta)),cex.main=3)
plot(density(tau), xlim=c(-0.005,0.01), lwd=2, col="blue4", main=expression(paste(tau)),cex.main=3)
```