BMTRY 763

Fitting CAR Models using Nimble

CAR models are those that include a CAR component ie *Conditional Autoregressive* component. This component can be used to model the spatial correlation in the dataset. An example of this kind of model in Nimble code, where a BYM convolution model is defined, is:

```
library(nimble)
LconvCode<-nimbleCode({
for(i in 1:N){
log(theta[i])<-a0+v[i]+B[i]
lambda[i]<-theta[i]*texp[i]
y[i]~dpois(lambda[i])
v[i]~dnorm(0,tauv)
}
for(k in 1:L){wei[k]<-1}
B[1:N]~dcar_normal(adj[1:L],wei[1:L],num[1:N],tauB,zero_mean=1)
a0~dnorm(0,tau0)
tauv~dgamma(2,0.5)
tau0~dgamma(2,0.5)
tauB~dgamma(2,0.5)
})
```

On Homeroom
Correlated Heterogeneity in WinBUGS.pdf is available for you to read.

There are a range of files (WinBUGS ODCs) on Homeroom for you to examine and run

Log_linear_UH_SC_congen_abnor.odc
Congen_abnor_SC_gamma_poisson.odc
CAR_normal_congen_abnor_SC.odc

They are in correlated_Hfiles.zip

1) Describe the models specified in the three files using model notation
   (eg $y_i \sim$ .....)
2) Compare the model fits using DIC, and MSPE
3) For the 'best' model obtain a posterior median relative risk map, and a map of the posterior mean standardized residuals.