

Re: WinBugs Conditional Formulation

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- *From:* "Anon." <bob.ohara@xxxxxxxxxxxx>
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Jean wrote:

On Mar 16, 1:51 pm, "Anon." <bob.oh...@xxxxxxxxxxxx> wrote:

Jeanwrote:

I realize that this should be probably be an easy question, but I'm drawing a mental block. Any suggestions on the following problem would be appreciated.

Problem: I have a large simulation program that, given a set of fixed input conditions, provides a random response D .

The general problem is structured: $P(D|a,g,h)$ $P(g)$ $P(h)$ $P(a|b)$ $P(b|c)$.

G , H , C are random variables with random statistical characteristics, e.g. mean and variance are random variables.

Once C is sampled, I know $P(b|c)$ and $P(a|b)$ [fixed probabilities]. One goal of the analysis is to characterize the CDF of $P(D|c)$.

It seems to me that this should be relatively easy to setup in Winbugs, but I seem to be making it more complicated than it should be.

Can I treat the parameters $P(a|b)$ and $P(b|c)$ as just weights?

Any suggestions on a WinBugs formulation would be very welcome.

No, they're stochastic nodes: draw the DAG and it should become clear. Of course, your probability densities have to be ones that BUGS supports (unless you want to start playing with the ones trick).

It's difficult to give more precise advice, without knowing the details of the model.

Bob

Re: WinBugs Conditional Formulation

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Thanks Prof O'Hara. After thinking about this a bit more, I think what I have is a situation involving stratified sampling, probably with clusters of two different variables. The probabilities are actually the probability of a sample being from one of the clusters for variable 1 and again for variable 2. The 5 clusters for variable 1 are broken down into 10 clusters for variable 2 and a random sample is taken from each of the 50 resulting cells. Are you aware of any simple examples of stratified sampling with MCMC? I've gone through the examples that come with Winbugs.

No I'm not, and it's not too clear to me what the full model is (I don't work with these sorts of problems!). However, some thoughts, in the hope that they're useful:

You have a 5x10 grid, and each individual can be in one cell. So if p_{ij} is the probability that an individual is in cell ij , you can model the group membership (for a single individual) as such:

```
model {
  for(i in 1:5) {
    # which category in group 1 the individual belongs to
    var1[i] ~ dcat(p1[])
    for(j in 1:10) {
      # which category in group 2 the individual belongs to
      # Probability depends on var1
      var2[i,j] ~ dcat(p2[j,])
    }
  }

  # Priors: could also set alpha in the data.
  p1[1:5] ~ ddirch(alpha[1:5])
  for(i in 1:5) {
    p2[i, 1:10] ~ ddirch(alpha[])
  }
  for(i in 1:10) { alpha[i] <- 1 }
}
```

Of course, if you know p_1 and p_2 , you can set them directly.

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I hope this helps!

Bob

P.S. I'm not a professor, although any reasonable offers accepted...

—

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