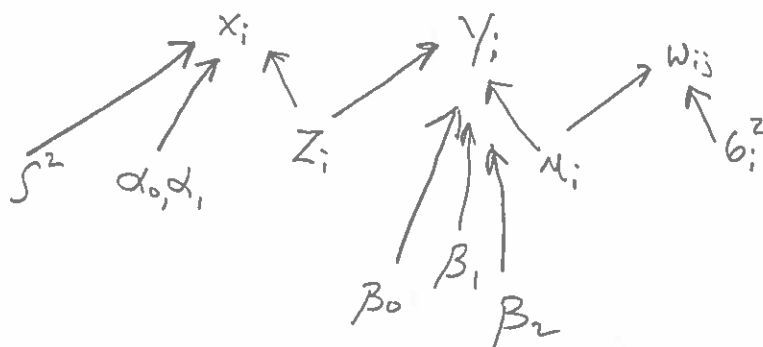


5.



y_i = counts on plot i

w_{ij} = soil water rep j on plot i

x_i = accurate estimate of cover on plot i

z_i = true, unobserved cover on plot i

u_i = mean soil water on plot i

$$[\underline{\beta}, \underline{u}, \underline{g^2}, \underline{z}, \underline{\alpha}, S^2 | \underline{x}, \underline{y}, \underline{w}] \propto \prod_{i=1}^{100} \prod_{j=1}^5 [y_i | e^{\beta_0 + \beta_1 u_i + \beta_2 z_i}]$$

data model:

$$h(\alpha_0, \alpha_1, z_i) = \frac{e^{\alpha_0 + \alpha_1 z_i}}{1 + e^{\alpha_0 + \alpha_1 z_i}}$$

$$\times [w_{ij} | u_i, g_i^2]$$

$$\times [x_i | h(\alpha_0, \alpha_1, z_i), S^2]$$

$$\times [u_i] [g_i^2] [\beta_0] [\beta_1] [\beta_2] [\alpha_0] [\alpha_1] [S^2] [z_i]$$

$$y_i \sim \text{Poisson} \left(e^{\beta_0 + \beta_1 u_i + \beta_2 z_i} \right) [\beta_2]$$

$$x_i \sim \text{beta} \left(M(h(\alpha_0, \alpha_1, z_i), S^2) \right) \xrightarrow{w_{ij}} w_{ij} \sim \text{gamma} \left(\frac{u_i^2}{g_i^2}, \frac{u_i}{g_i^2} \right)$$

$$g_i^2 \sim \text{unif} (0, 100)$$

$$\beta_0 \sim \text{normal} (0, 10000)$$

$$\beta_1 \sim \text{normal} (0, 1000)$$

$$\beta_2 \sim \text{normal} (0, 1000)$$

$$\alpha_0 \sim \text{normal} (.05, .006)$$

$$\alpha_1 \sim \text{normal} (1.07, .13)$$

$$S^2 \sim \text{inverse gamma} (10.2, 630)$$

$$z_i \sim \text{unif} (0, 1)$$

$M()$ is moment
matching function
returning params
from moments