Remember from the basic laws of probabilty that

$$p(z_1, z_2) = p(z_1 \mid z_2)\, p(z_2) = p(z_2 \mid z_1)\, p(z)_1$$

This genearlizes to:

$$\mathbf{z} = (z_{1,} z_2, \ldots z_n)$$

$$p(z_{1,} z_2, \ldots z_n) = p(z_n \mid z_{n-1 \ldots .} z_1) \ldots\ldots p(z_3 \mid z_2, z_1)\, p(z_2 \mid z_1)\, p(z_1)$$

where the components z_i may be scalars or subvectors of **z** and the sequence of their conditioning is arbitrary. This equation can be simplified using knowledge of indepdence.