

$$\text{Posterior marginal } p(\psi \mid \mathbf{y}) = \frac{p(\boldsymbol{\theta}, \psi \mid \mathbf{y})}{p(\boldsymbol{\theta} \mid \psi, \mathbf{y})} \approx \frac{p(\psi)p(\boldsymbol{\theta} \mid \psi)p(\mathbf{y} \mid \boldsymbol{\theta})}{\tilde{p}(\boldsymbol{\theta} \mid \psi_h^*, \mathbf{y})} = \tilde{p}(\psi_h^* \mid \mathbf{y})$$

