Goal: approximate the true posterior $q(\theta) \approx p(\theta|\mathcal{D})$

$$p(\theta|\mathcal{D}) \propto p_0(\theta)\ p(\mathcal{D}_1|\theta)\ p(\mathcal{D}_2|\theta)$$

$$\mathcal{D} = \mathcal{D}_1 \cup \mathcal{D}_2,\ \mathcal{D}_1 = \{x_1\},\ \mathcal{D}_2 = \{x_2, x_3\}$$

$$N = 3, N_1 = 1, N_2 = 2$$

DEP

$$\tilde{p}(\theta) \propto p_0(\theta)\ F_1(\theta)\ p(\mathcal{D}_2|\theta) \approx q^{new}(\theta) \propto p_0(\theta)\ F_1(\theta)\ F_2^{new}(\theta)$$

SDEP

$$\tilde{p}(\theta) \propto p_0(\theta)\ f(\theta)^{N-N_2}\ p(\mathcal{D}_2|\theta) \approx q^{new}(\theta) \propto p_0(\theta)\ f^{new}(\theta)^{N}$$

DSEP

$$\tilde{p}(\theta) \propto p_0(\theta)\ f_1(\theta)^{N_1}\ f_2(\theta)^{N_2-1}\ p(x_3|\theta) \approx q^{new}(\theta) \propto p_0(\theta)\ f_1(\theta)^{N_1}\ f_2^{new}(\theta)^{N_2}$$