$$E^{\theta^{(t+ni)}}[u(\theta^{(t+ni)})] = \int_{\theta^{(t+ni)}} u(\theta^{(t+ni)})p(\theta^{(t+ni)})d\theta^{(t+ni)} \tag{1}$$

$$P(\theta^{(t+1)}|\theta^t)d\theta^{(t+1)} = P(u(\theta^{(t+ni)}, \theta^t))du \tag{2}$$

$$P(\theta^{(t+ni)})d\theta^{(t+ni)} = \int_{\theta^t} P(\theta^{(t+ni)}|\theta^t)p(\theta^t)d\theta^t d\theta^{(t+ni)} \tag{3}$$

$$= \int_{\theta^t} P(V(\theta^{(t+ni)}, \theta^t))dVd\theta^t \tag{4}$$

$$E^{\theta^{(t+ni)}}[u(\theta^{(t+ni)})] = \int_{\theta^{t+i}} u(\theta^{(t+ni)})P(\theta^{(t+ni)})d\theta^{(t+ni)} \tag{5}$$

$$= \int_V \int_{\theta^t} u(\theta^{(t+ni)})P(V(\theta^{(t+ni)}, \theta))dVP(\theta^t)d\theta^t \tag{6}$$

$$= E^{\theta^t}[E^V[u(\theta^{(t+ni)})]] \tag{7}$$

$$\theta^{(t+1)} = \theta^t - \eta_t \delta L^t(v^t, \theta^t) \tag{8}$$

$$\theta^{t+n_k} = \theta^t - \sum_{i=1}^{n_i} \eta_{t+i} \delta L^{t+i}(v^{t+i}, \theta^{t+i}) \tag{9}$$

$$E^V[u(\theta^{(t+ni)})] = E^V[u(\theta^t + \frac{\sum_{i=1}^{n_i} -\eta_{t+i}\delta L^{t+i}(v^{t+i}, \theta^{t+i})}{\nabla})] \tag{10}$$