

Non normalized importance weights are calculated as follow:

$$w_t^i = \frac{p(y_t|x_t^i)f(x_t^i|x_{t-1}^{A_t^i})}{q_{t|t-1}(x_t^i|x_{t-1}^{A_t^i}, y_t)}$$

where A_t^i is the index of the particle's ancestor, p the observation density, f the transition density and q the proposal density

The ESS is calculated as follow:

$$ESS_t = \frac{1}{\sum_{i=1}^N (W_t^i)^2}$$

where W_t^i are the normalized weights