Metropolis Algorithm: Update Procedure

Input: $X_t = x_t$

Sample proposal from transition kernel: $Y_t \sim q(y|x_t)$

Acceptance step:

$$X_{t+1} = \begin{cases} Y_t & \text{with probability } \rho(x_t, Y_t) \\ x_t & \text{with probability } 1 - \rho(x_t, Y_t) \end{cases}$$

Acceptance probability $\rho(x_t, Y_t) = \min\left(1, \frac{\tilde{f}_X(Y_t)}{\tilde{f}_X(x_t)}\right)$