

Suppose, there are two equally likely outcomes: 0 or 1, and $P_0(0) = P_0(1) = 0.5$. Now, let's consider two outcomes in a sequence, so that the transitional probability of the next outcome given that we know the value of the previous one is defined as

$$P(y|x) \propto \begin{cases} P_0(y), & y \geq x \\ 0, & y < x \end{cases}$$

(similar to what we have for the afforested BFI), so that $P(0|0) = P(1|0) = 0.5$; $P(0|1) = 0$, $P(1|1) = 1$. Then, we would like to know the marginal distribution for that 'next' value, i.e. $P(y)$. This distribution can be found as

$$P(y) = \int P(y|x) \cdot P_0(x) dx,$$

and $P(0) = 0.25$, $P(1) = 0.75$ that is different from the prior distribution P_0 .