1. Exit probability

The exit probability for arbitrary α is

$$E_+(y) = \frac{1}{2}\left[1 - \frac{G_\alpha(y)}{G_\alpha(a)}\right], \tag{1}$$

where $a = \alpha/(2N)$ and $G_\alpha(y) = 2B(y; 1-\alpha, 1-\alpha) - B(a; 1-\alpha, 1-\alpha) - B(1-a; 1-\alpha, 1-\alpha)$. In here, $B(x; y, z)$ is the incomplete beta function [1].

2. Consensus time

The consensus time for arbitrary α is

$$T_{\rm con}(y) = N[H_\alpha(a) - H_\alpha(y)] \tag{2}$$

where

$$\begin{aligned} H_\alpha(y) =& 2\int^{y} \left[B[y'; \alpha, \alpha] - B[a; \alpha, \alpha]\right] y'^{\alpha}(1-y')^{\alpha} dy' \\ & - 2E_+(y) \int_{a}^{1-a} \left[B[y'; \alpha, \alpha] - B[a; \alpha, \alpha]\right] y'^{\alpha}(1-y')^{\alpha} dy' \end{aligned}$$

References

[1] M. Abramowitz and I. A. Stegun, *Handbook of Mathematical Functions* (Dover, New York, 1972).