

Test:

$$P(D^+ = 0) = E[e^{-W^+}]$$

$$P(D^- = 0) = E[e^{-W^-}]$$

$$E[e^{-W^+}] = \int_b^\infty e^{-x} (-\alpha b^\alpha x^{\alpha-1}) dx$$

$$E[e^{-W^-}] = \int_b^\infty e^{-x} (-\beta c^\beta x^{\beta-1}) dx$$

Case1: take a=d=1, alpha=beta=3, b=c=3.

Expected degree = 4.5

n (size)	2,000	10,000	100,000	1,000,000
P(D+=0)	0.025	0.0248	0.02284	0.02303
Sample Mean: $e^{\{-W^+\}}$	0.02	0.0229	0.02300	0.02299
P(D-=0)	0.0232	0.0207	0.02286	0.02281
Sample Mean: $e^{\{-W^-\}}$	0.0232	0.0229	0.02300	0.02299

And we get integral of $E[e^{-W^+}]$:

$$-4\exp(-3) - 27\text{Ei}(3\exp_{\text{polar}}(l\pi))/2 + 27\text{Ei}(+\infexp_{\text{polar}}(l*\pi))/2$$

Graph: disconnected

Number of strongly connected components: 99

Case2: take a=d=1, alpha=beta=3, b=c=10.

Expected degree = 15.0

n (size)	2,000	10,000	100,000
P(D+=0)	0.0005	0.0	1e-05
Sample Mean: $e^{\{-W^+\}}$	0.01427291e-05	1.0027e-05	9.907e-06
P(D-=0)	0.0	0.0	0.0
Sample Mean: $e^{\{-W^-\}}$	1.01427291e-05	1.0027e-05	9.907e-06

And we get integral of $E[e^{-W^+}]$:

$$-46\exp(-10) - 500\text{Ei}(10\exp_{\text{polar}}(l\pi)) + 500\text{Ei}(+\infexp_{\text{polar}}(l*\pi))$$

Graph: Strongly connected

Case3: take $a=0.8$, $\alpha=3$, $\beta=4$, $d=1.333$ $b=1.22$ $c=1.37$

Expected degree = 1.829

n (size)	2,000	10,000	100,000
$P(D^+=0)$	0.164	0.1834	0.17916
Sample Mean: e^{-W^+}	0.180	0.179	0.179687
$P(D^-=0)$	0.2005	0.1901	0.19586
Sample Mean: e^{-W^-}	1.197	0.195	0.195655

Graph: disconnected

Number of strongly connected components: 900

Case4: take $a=0.8$, $\alpha=3$, $\beta=6$, $d=1.333$ $b=1.22$ $c=1.37$

Expected degree = 1.200

n (size)	2,000	10,000	100,000
$P(D^+=0)$	0.2945	0.3025	0.296
Sample Mean: e^{-W^+}	0.306	0.3094	0.3104
$P(D^-=0)$	0.317	0.341	0.3475
Sample Mean: e^{-W^-}	0.329	0.3360	0.3373

Graph: disconnected

Number of strongly connected components: 1671