Making assorted networks by re-wiring

We will generate scale-free networks according to the parameters listed in Table 1 using the classic BA-algorithm. Following network generation, we will update the networks as following:

1. Assign nodes randomly as male (0) or female (1).
2. Calculate temporary value of sex-assortativity in the network (r_t).
3. If r_t is less than the desired r, randomly choose a percentage of type 0–1 edges (i.e, a male–female edge) and re-wire them.
4. Repeat step 3 until $r_t = r$ or until a max number of re-wirings is completed.

Table 1: Design of pilot study I for generating networks.

Variable	Value
Sex-assortativity, r	-0.4, - 0.2, 0, 0.2, 0.4
Degree distribution, $p(k)$	$\frac{k^{-\alpha}}{\zeta(\alpha)}$
Mean degree, $< k >$	10
Network size, N	$500, 1 \cdot 10^3$

Step 1: Assign node sex

Step 2: Calculate r_t

Step 3: Re-wire if less than r_f

−0.06

0.307