

**Figure S2** Mutation frequency spectrums (MFSs) under the constant population size model and the bottleneck scenario. n = 10,  $\theta = 1,000$  and the time is scaled so that one unit represents  $4N_0$  generations. For the bottleneck scenario, we assumed the duration of bottleneck  $t_1 = 0.01$ , the time of bottleneck ended  $t_0 = 0.1$ , and  $N_0/N_1 = 10$ , where  $N_0$  is the effective population size before and after the bottleneck,  $N_1$  the effective population size during the bottleneck. The MFS was estimated from  $10^5$  simulated data sets.