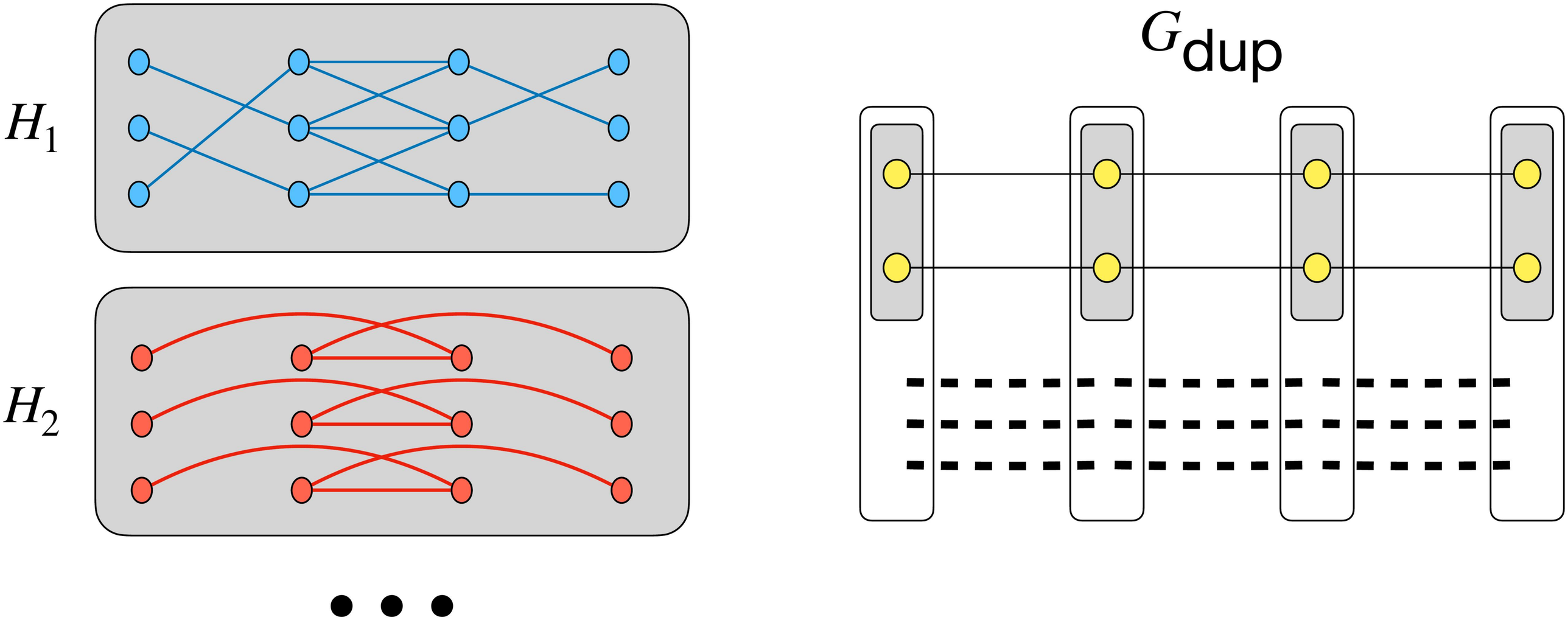

H_1
H_2
G_{dup}