

# Community Detection in Gene Network

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# Review

$W$ : gene correlation matrix.

$M = -D^{-1/2}WD^{-1/2}$ , where  $D$  is the diagonal matrix of row sums of  $W$ .

Detection of Community:

$$\min_{\|u\|_2=1} f(u) = u^T M u + \rho \|u\|_1$$

$$C = \{i : |u_i| \leq d\}.$$

# RSA

RSA(Random Searching Algorithm): we could randomly select  $u_1, \dots, u_N \sim \text{unif}(S^n)$ , and calculate  $f(u_i), 1 \leq i \leq N$ .