- [x] multigraph represented by their edge multiplicity sequence

$$\mathbf{M} = (M_{ij} : (i, j) \in R)$$

where $R$ is the canonical site space for undirected edges $R = \{(i, j) : 1 \leq i \leq j \leq n\}$

$$(1,1) < (1,2) < \ldots < (1,n) < (2,2) < (2,3) < \ldots < (n,n)$$

☑ the number of vertex pair sites is given by

$$r = \binom{n+1}{2}$$

☑ edge multiplicities as entries in a matrix

$$\mathbf{M} = \begin{bmatrix} M_{11} & M_{12} & \dots & M_{1n} \\ 0 & M_{22} & \dots & M_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & M_{nn} \end{bmatrix} \qquad \mathbf{M} + \mathbf{M}' = \begin{bmatrix} 2M_{11} & M_{12} & \dots & M_{1n} \\ M_{12} & 2M_{22} & \dots & M_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ M_{1n} & M_{2n} & \dots & 2M_{nn} \end{bmatrix}$$

multigraph representation of network data

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