$$L_{i,j} = \begin{cases} w_{i,j} & \text{if } (i,j) \in E \\ 0 & \text{otherwise} \end{cases}$$

$$L_{i,i} = -\sum_{\ell \neq i} L_{i,\ell}$$

where

$$L \in \mathbb{R}^{n \times n}$$
$$w \in \mathbb{R}^{n \times n} \text{ edge weight matrix}$$
$$E \in \{\mathbb{Z}^2\} \text{ index edges}$$