Workspace

Start with a weighted directed graph $\mathbf{G}$ containing vertices $v \in \mathbf{V}$ and edges $e \in \mathbf{E}$.

We start by defining a weight function for the vertices $F : \mathbf{V} \to \mathcal{R}$ with a corresponding weight value $f_i = F(v_i)$. Similarly we add a weight for each edge given by the weight function $W : \mathbf{E} \to \mathcal{R}$ with corresponding weights $w_i = W(e_i)$. Finally, define an activation function on each vertex taking an affine parameter λ as $\mu\,[v] : \mathcal{R}x\mathcal{R} \to \mathcal{R}$. For simplicity let $\mu_i(\lambda) := \mu[v_i](\lambda)$.

Now we can define the potential energy of the system by:

$$\mathcal{E} = \sum_i \left[f_i - \mu_i(\sum_j w_j f_j, \lambda) \right]^2 \tag{1}$$