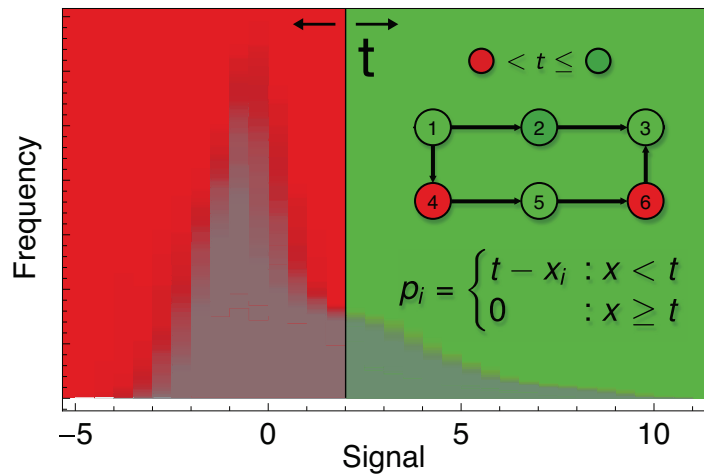
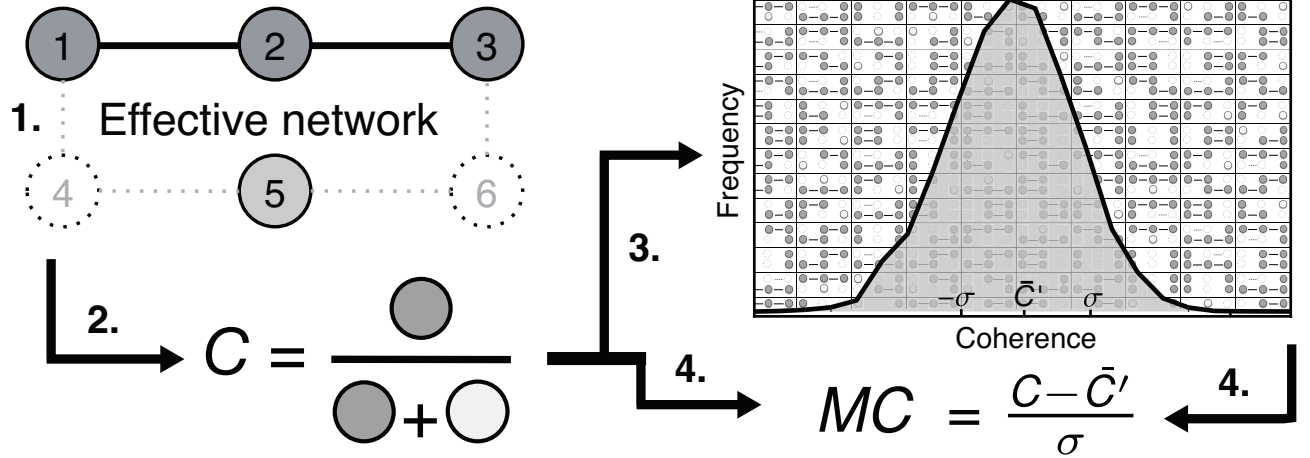


### (a) Gene expression



### (b) Metabolic coherence



### (c) GIMME

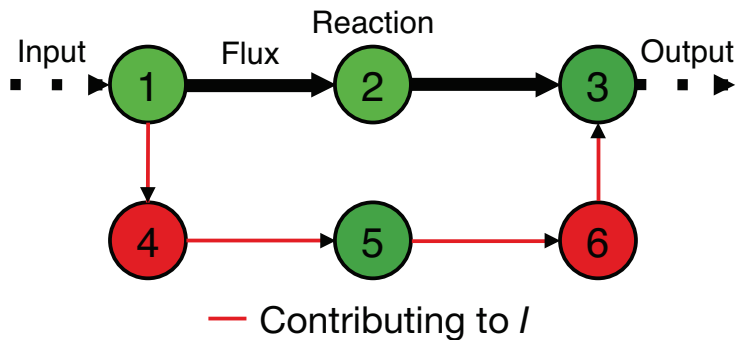
Simultaneous max. of  $v^{obj}$  and min. of  $l$   
(fluxes through unexpressed reactions)

$$\text{Min } l = \sum_{j=1}^n p_j |v_j| \quad \text{GIMME objective}$$

s.t.  $\mathbf{S} \cdot \mathbf{v} = 0$  Steady-state condition

$$\mathbf{v}_{\min} \leq \mathbf{v} \leq \mathbf{v}_{\max} \quad \text{Flux capacities}$$

$$v^{obj} \geq v_{\max}^{obj} \cdot l \quad \text{Metabolic objective}$$



### (d) Comparison

