Network analysis of metabolic subsystems

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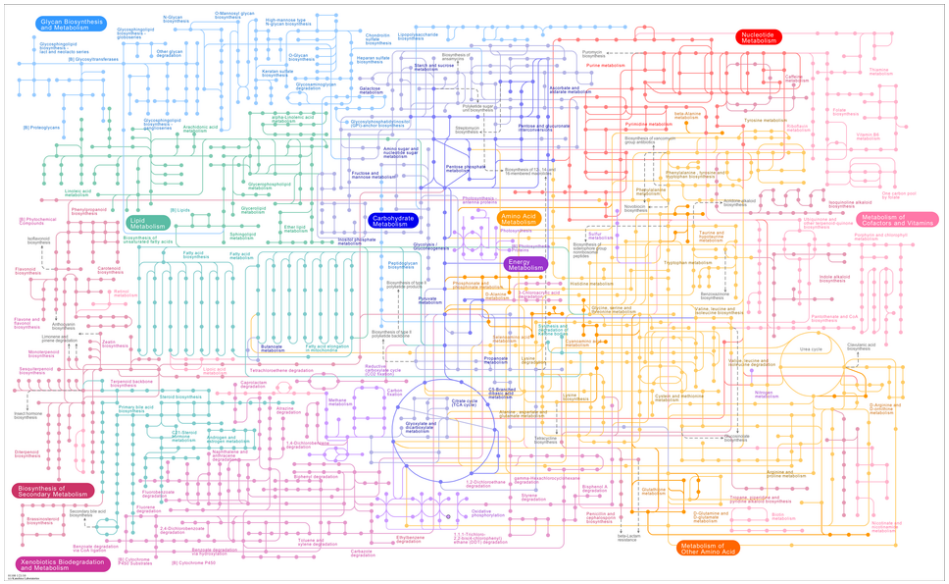
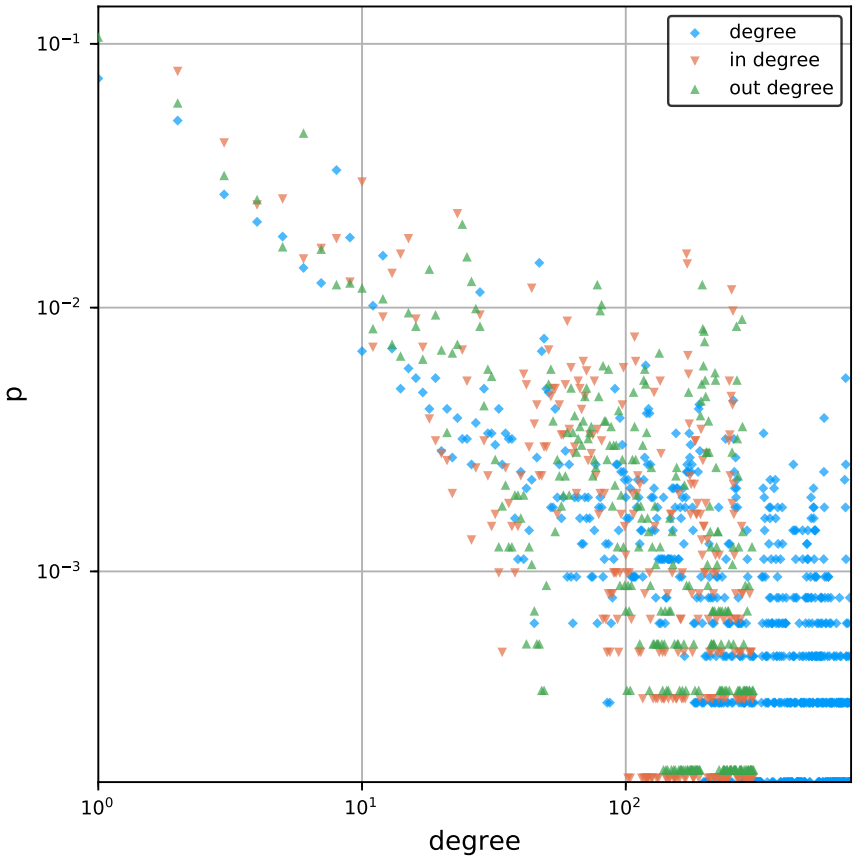


Network stats

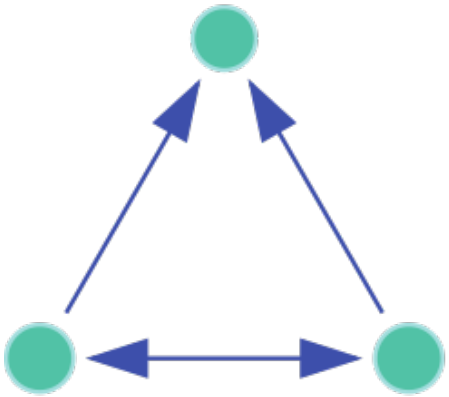


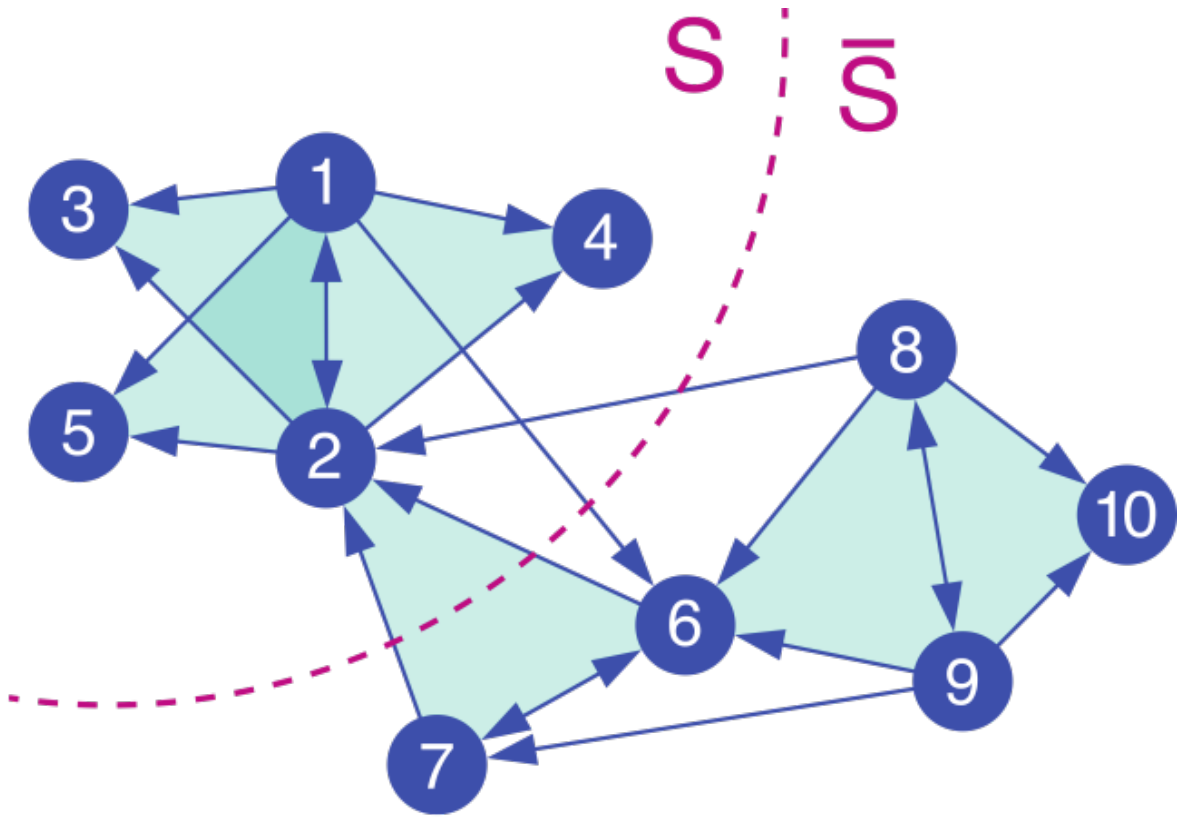
$\|V\|$	$\|E\|$	$\langle C \rangle$	E_{90}	ρ	$\langle k \rangle$
6,663	656,609	0.012	15	0.015	194.1

Community detection

Algorithm	NMI
Louvain Modularity	0.10
Clauset-Newman-Moore	0.27
Infomap	N/A
Girvan-Newman	N/A

Motif based community detection



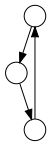
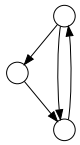
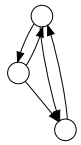
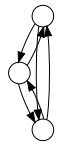
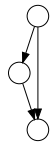
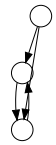
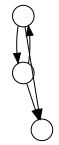


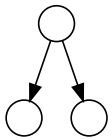
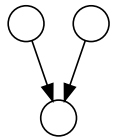
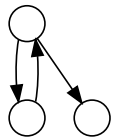
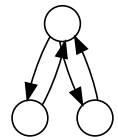
$$\phi_M(S) = \frac{\text{motifs cut}}{\min(8, 10)} = \frac{1}{8}$$

[1]

[1] source: http://snap.stanford.edu/higher-order/

Motif based community detection and motif significances

							
motif	M1	M2	M3	M4	M5	M6	M7
Z	-379.0	496.4	6,523	1,171,385	1,055	3,566	4,604
NMI	0.44	0.40	0.48	0.64	0.23	0.43	0.46

						
motif	M8	M9	M10	M11	M12	M13
Z	1,411	-867.2	2,599	1,293	1,387	40,286
NMI	0.11	0.09	0.09	0.20	0.23	0.42

$$Z = \frac{n - \mu_{\text{rand}}}{\sigma_{\text{rand}}}$$