

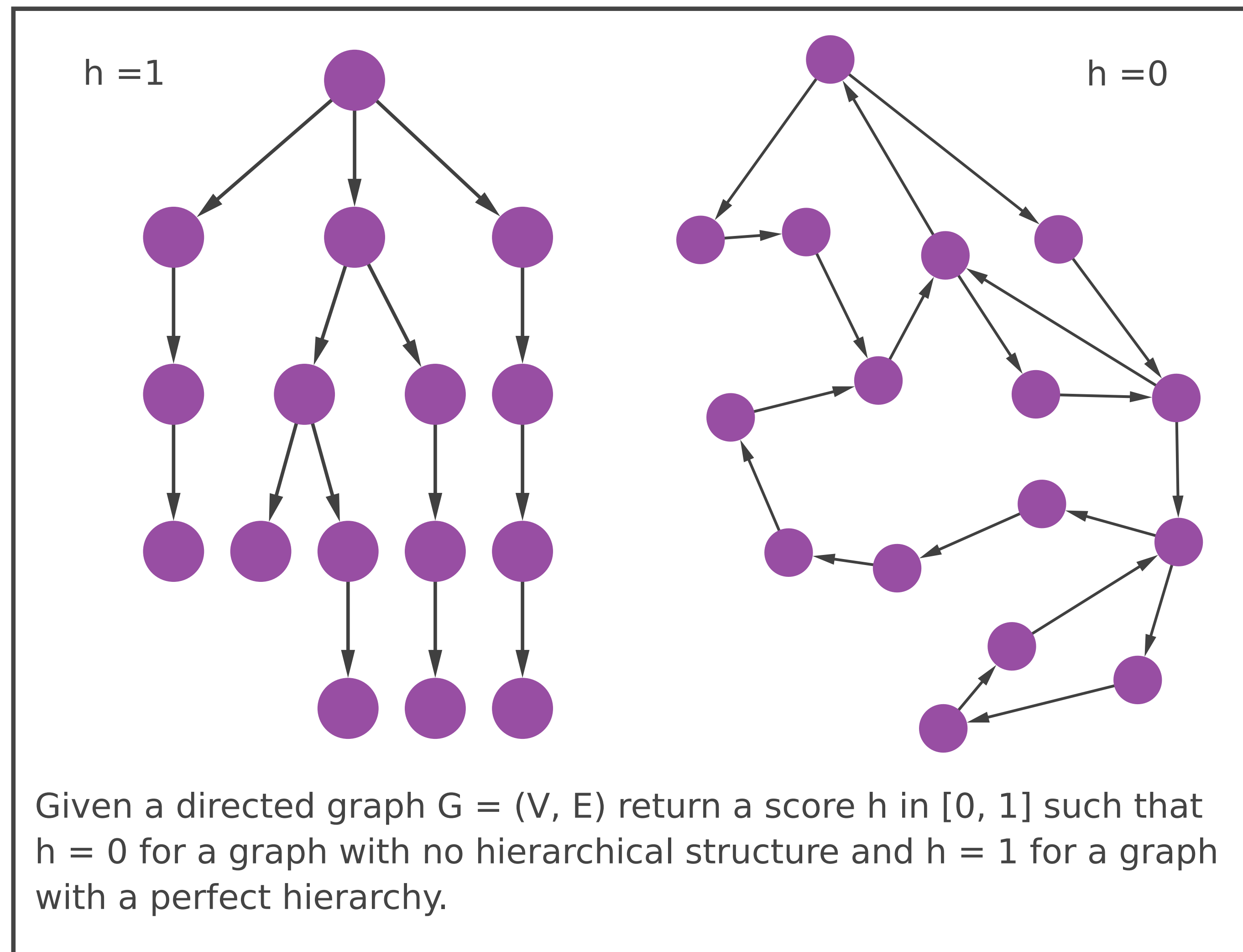
Using Arborescences to Estimate Hierarchicalness in Directed Complex Networks

Michele Coscia

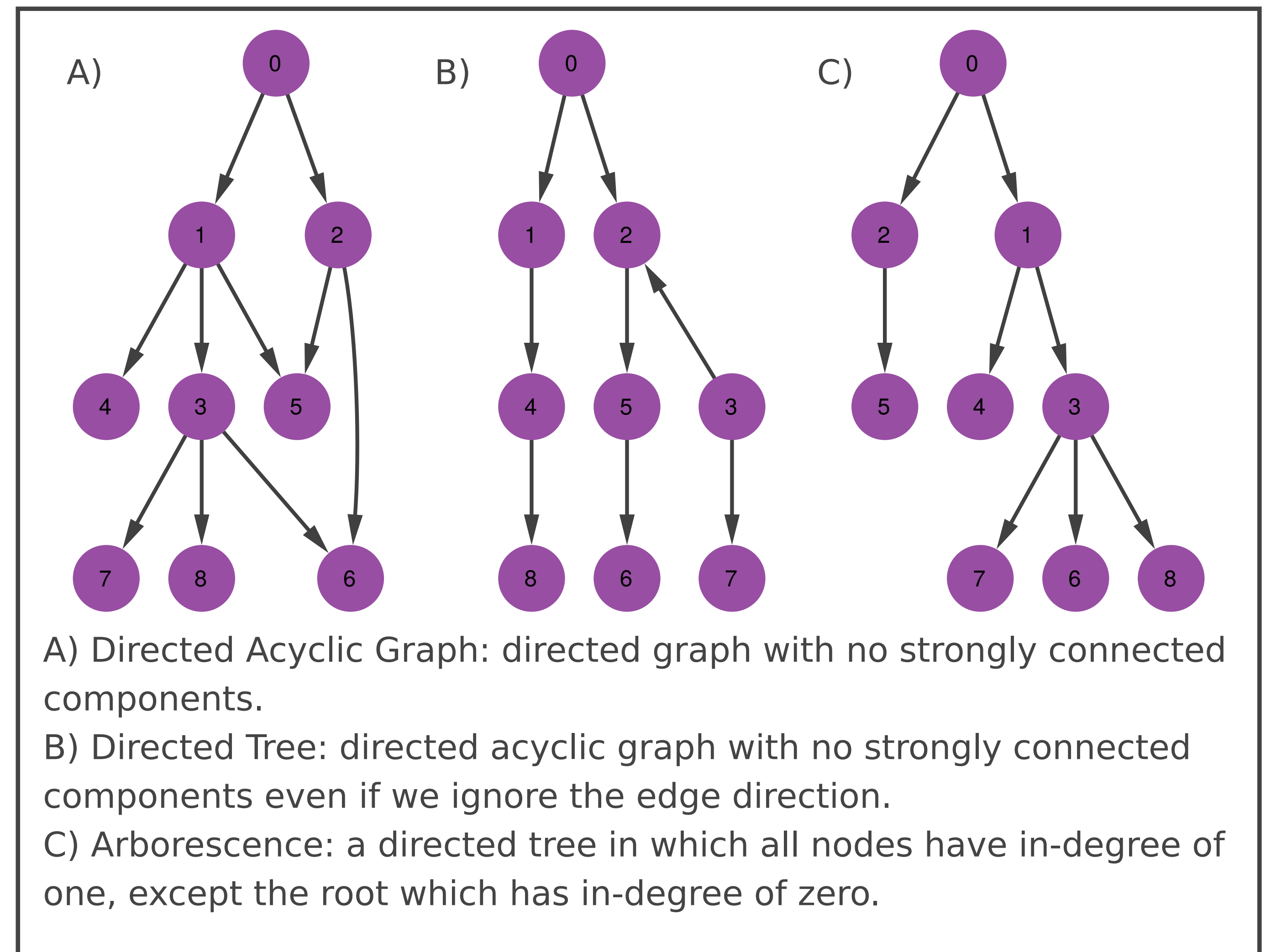
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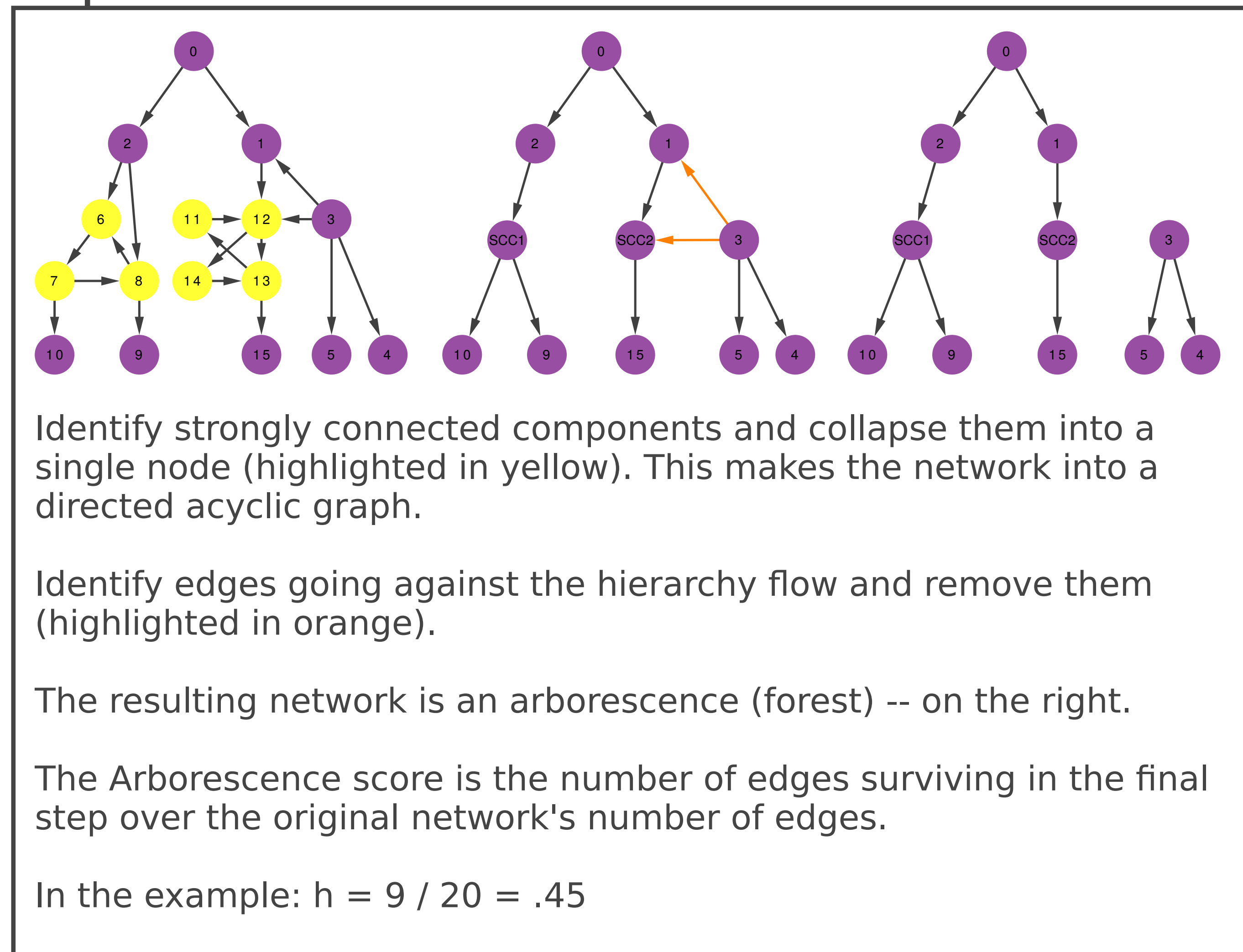
Problem



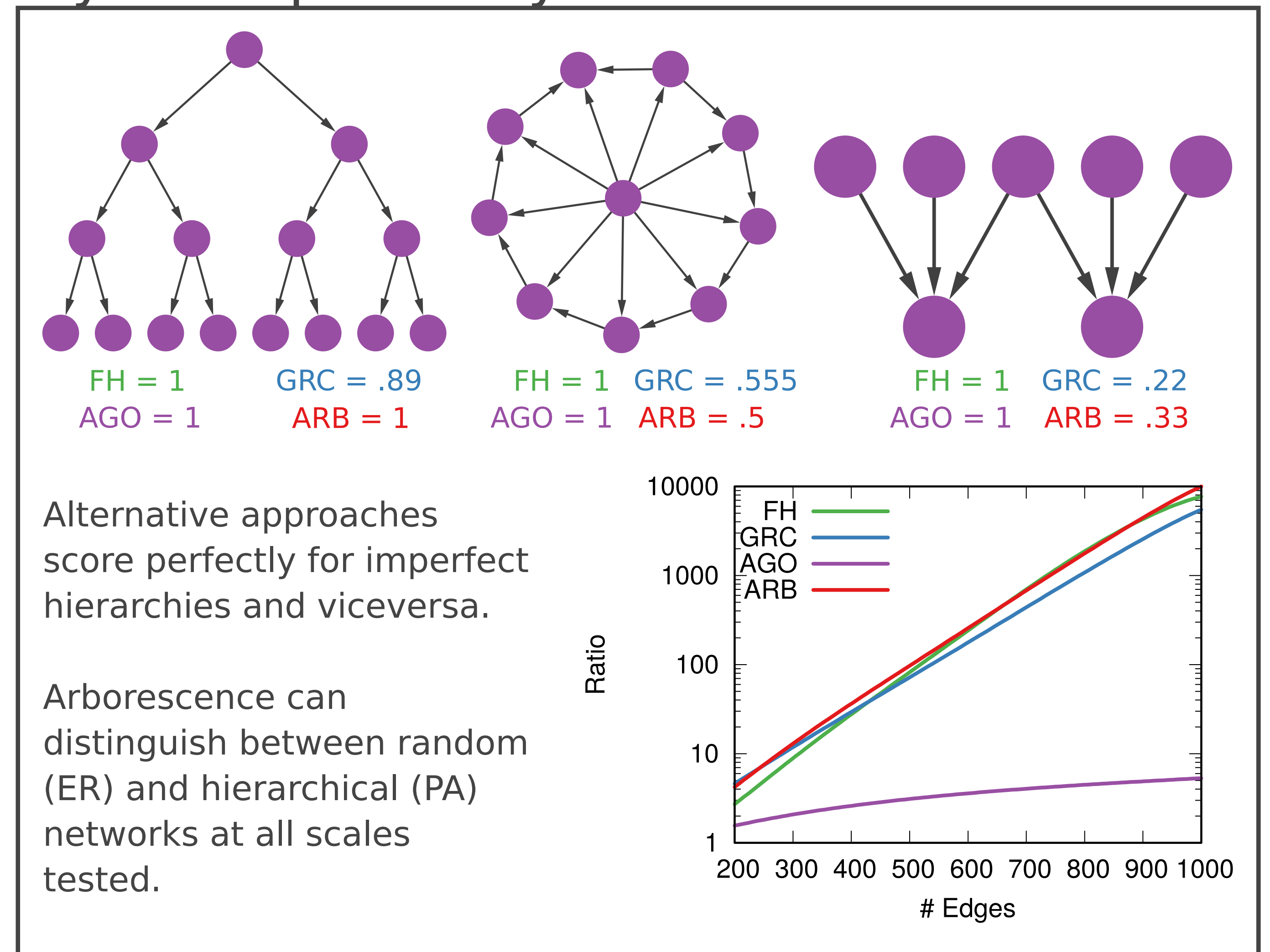
Definitions



Implementation



Toy Examples & Synthetic Networks



Literature Agreement

Network	V	E	E^*	t	FH	GRC	AGO	ARB	Agreement?
Colombia Social	863	9,639	131	0.021	-	x	-	-	✓
Colombia Mobility	863	6,614	22	0.012	x	x	x	x	✓
UN Migration Stocks*	175	1,546	8	0.002	x	x	x	x	✓
O*Net*	496	2,848	14	0.005	x	x	x	x	✓
C. Elegans Frontal	131	764	14	0.002	+	+	+	x	✓
Hiring Business	113	3,515	40	0.005	+	+	+	+	✓
Hiring CS	206	3,053	77	0.006	+	+	+	+	✓
Hiring History	145	2,496	60	0.004	+	+	+	+	✓
Literature Citation	118	613	613	0.012	+	+	+	+	✓
Literature Criticism	35	81	79	0.002	x	x	x	x	✓
Physician Trust	241	1,098	71	0.004	+	+	x	+	✓
Foodweb Everglades	69	916	26	0.002	+	+	+	+	✓
Foodweb Maspalomas	24	82	37	0.001	+	+	+	+	✓
Foodweb Chesapeake	39	177	60	0.001	x	+	+	+	✓
Foodweb ChesLower	37	178	34	0.001	x	+	+	+	✓
Foodweb ChesMiddle	37	209	21	0.001	x	+	+	+	✓
Foodweb ChesUpper	37	215	26	0.001	+	+	+	+	✓
Foodweb ChrystalC	24	125	7	0.001	x	x	+	x	✓
Foodweb ChrystalD	24	100	12	0.000	x	x	x	x	✓
Foodweb Mondego	46	400	27	0.001	+	+	+	+	✓
Foodweb StMarks	54	356	76	0.002	x	+	+	+	✓
Foodweb Michigan	39	221	17	0.001	+	+	+	+	✓
Foodweb Rhode	19	53	24	0.000	+	x	x	x	✓
Foodweb Florida	128	2,106	82	0.004	+	+	+	+	✓
Foodweb Narragan	35	220	10	0.001	+	+	+	+	✓
Yeast	1,870	2,277	2,203	0.051	x	-	x	+	✓

Case Study: Protein-Protein Hierarchies

