SUPPLEMENTAL MATERIAL: Influencers identification in complex networks through reaction-diffusion dynamics

I. SUPPLEMENTARY FIGURES AND TABLES

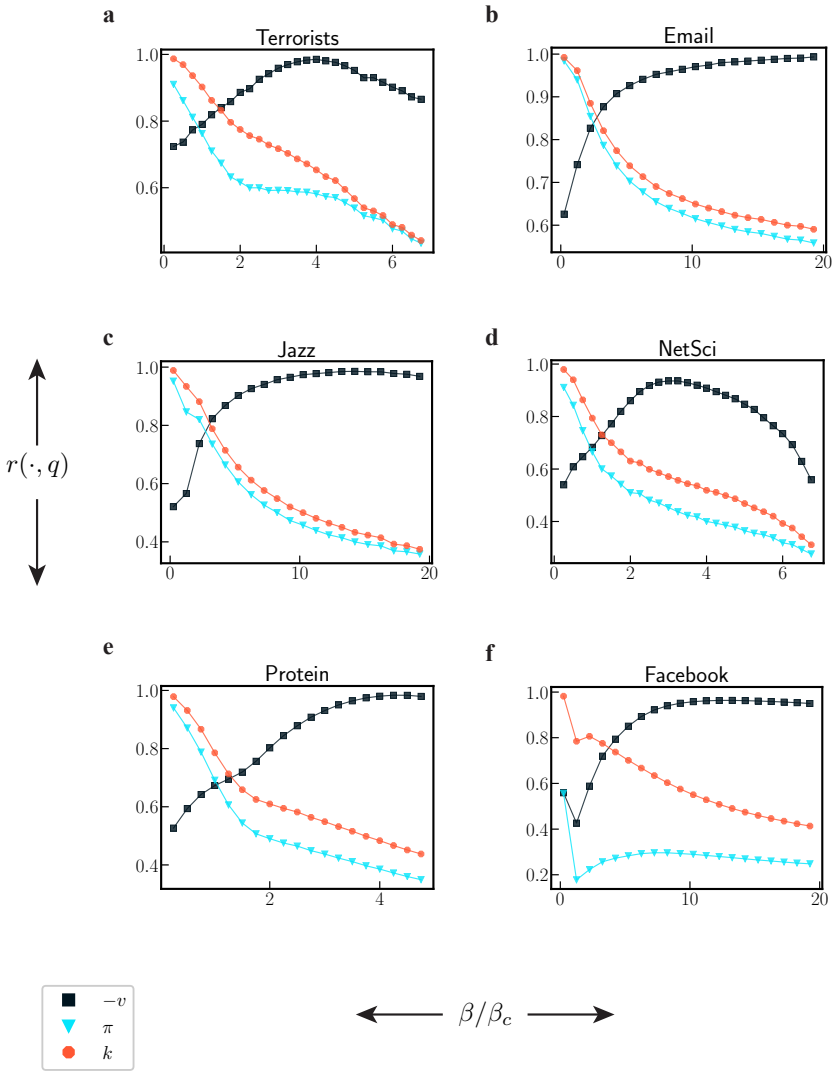

FIG. S1. Contact-network spreading model: a comparison between nodes centrality and node spreading ability q in the real networks analyzed in the main text. Each panel shows the Pearson linear correlation r between nodes centrality and nodes spreading ability q. Differently from the main text (Fig. 3 and Fig. 4), the metrics considered in addition to ViralRank (v) are PageRank (π), with dumping parameter $c = 0.85$ and degree centrality (k). Results are for: (a) 9/11 terrorists, (b) email, (c) jazz collaborations, (d) network scientists co-authorships, (e) protein interactions and (f) Facebook friendships. The PageRank performance is qualitatively similar but always worse than that of the degree centrality.

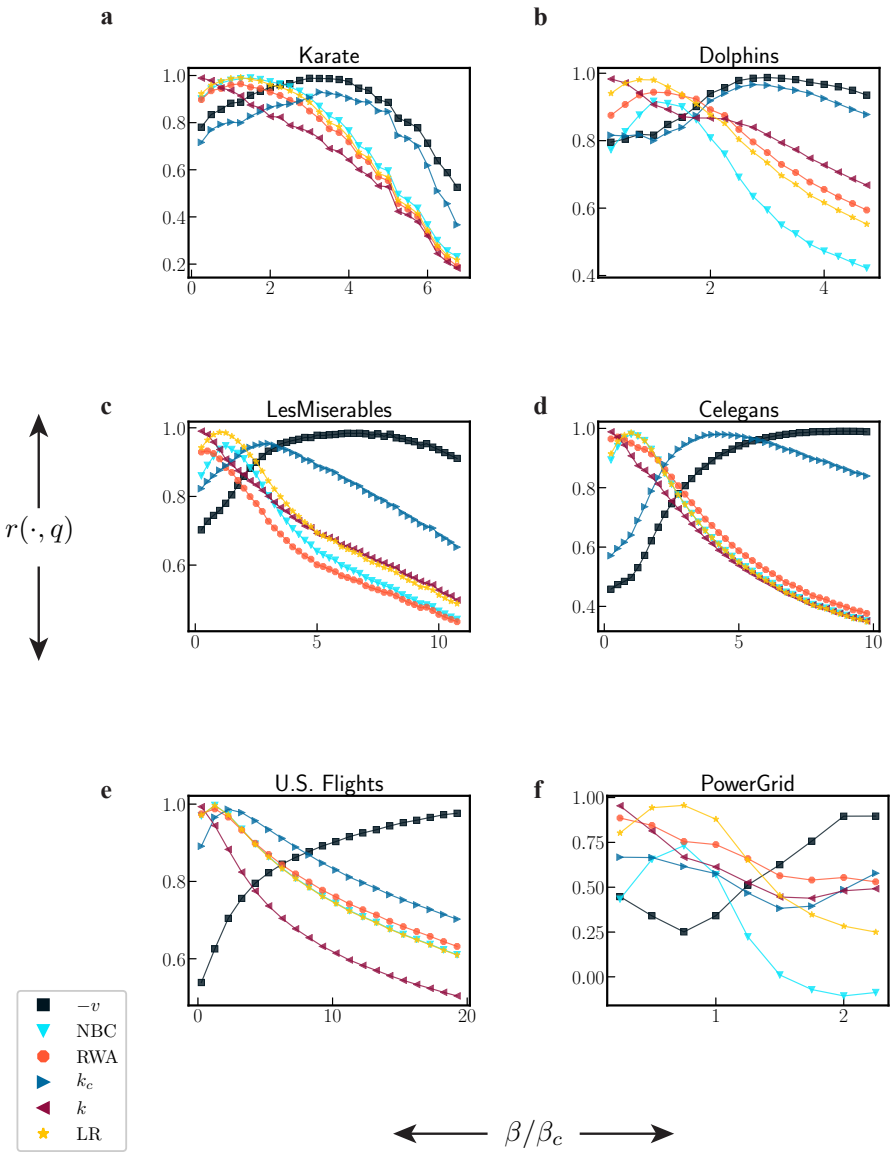

FIG. S2. Contact-network spreading model: a comparison between nodes centrality and nodes spreading ability q in real networks. Pearson linear correlation between nodes centrality and q as a function of β/β_c for six additional datasets: (a) karate club friendships, (b) dolphins interactions, (c) characters co-appearances in the novel 'Les Miserables', (d) C.elegans neural connections, (e) U.S. domestic flights and (f) U.S. powergrid supply lines. The structural properties of these networks, and of all other datasets, are reported in Table S1.

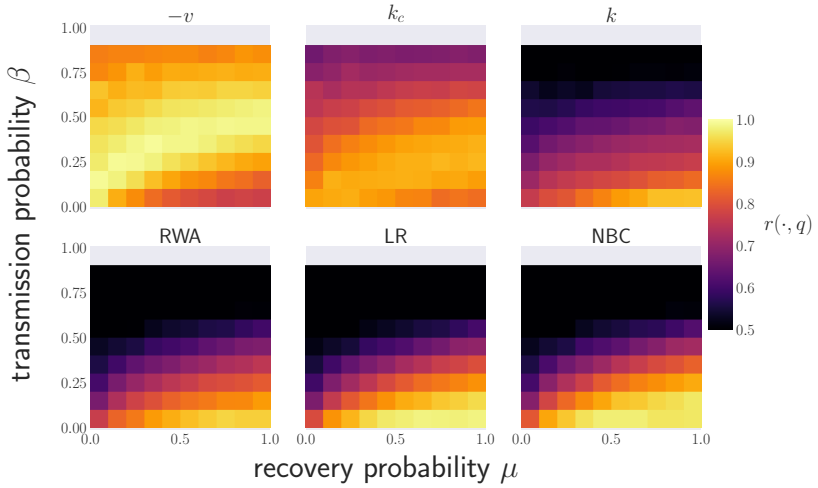

FIG. S3. Correlation in the full parameter space (β, μ) for 9/11 terrorists network.

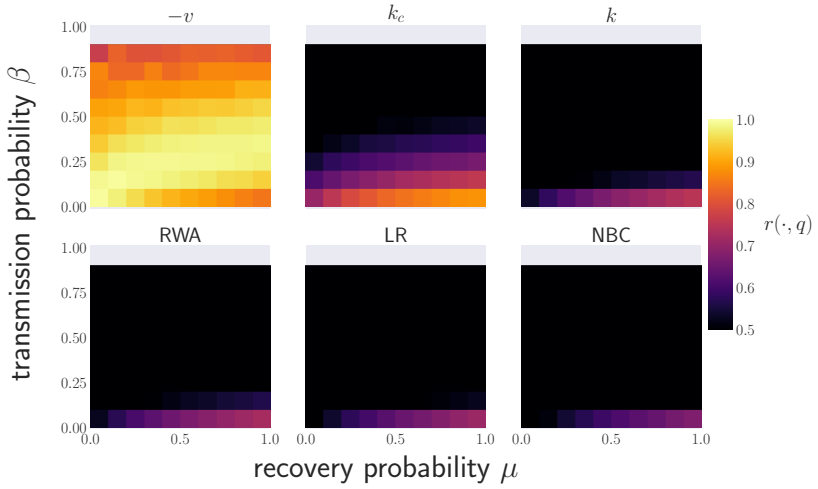

FIG. S4. Correlation in the full parameter space (β, μ) for jazz collaborations network.

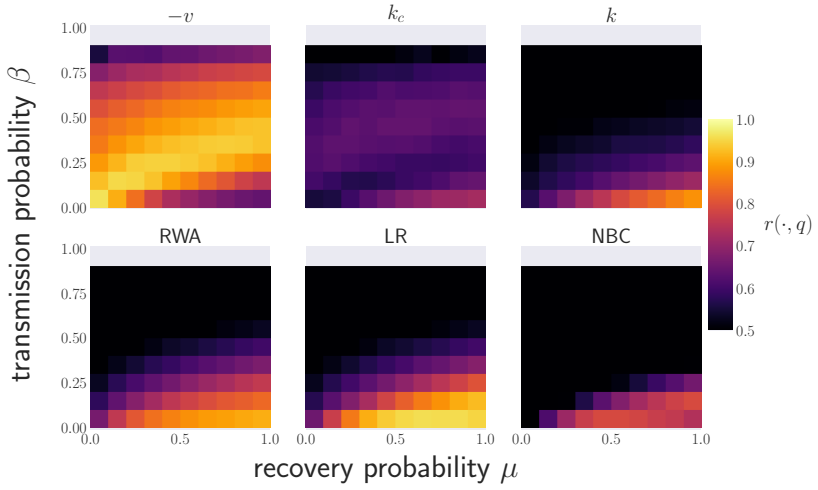

FIG. S5. Correlation in the full parameter space (β, μ) for network scientists co-authorships network.

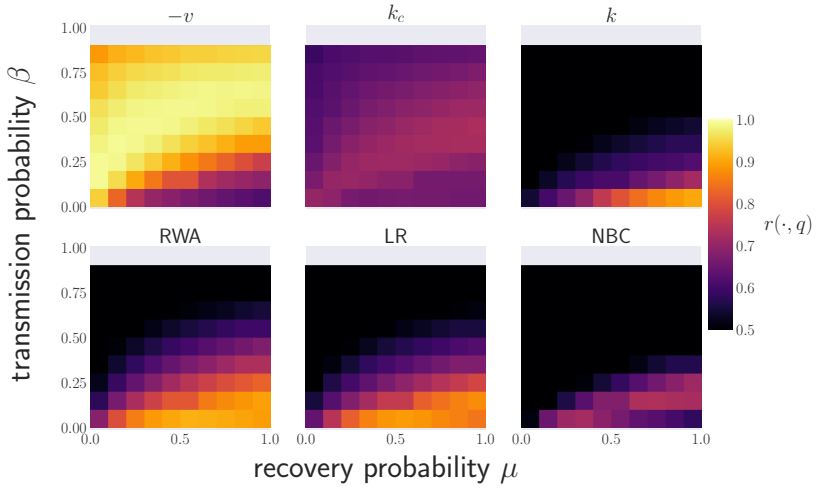

FIG. S6. Correlation in the full parameter space (β, μ) for protein interaction network.

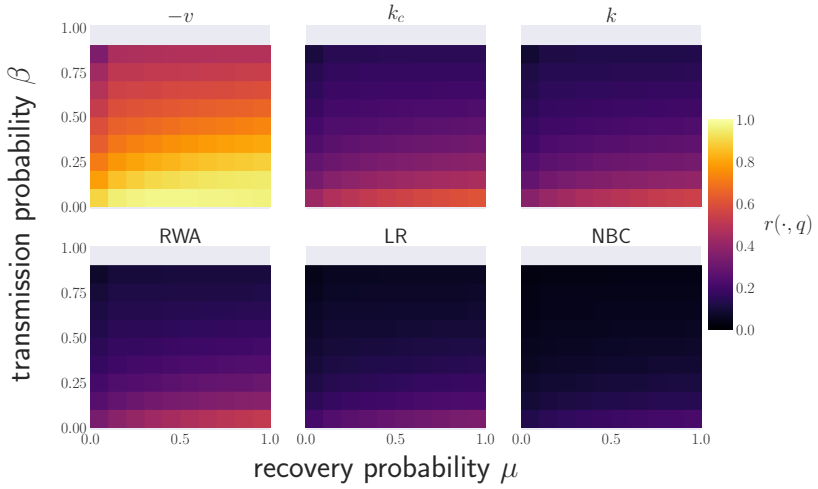

FIG. S7. Correlation in the full parameter space (β, μ) for Facebook friendships network.

	N	L	D	C	$\langle k \rangle$	$\langle k^2 \rangle$	β_c	β_u/β_c	Ref.
Karate	34	78	5	0.57	4.59	35.65	0.1477	2.50	[1]
Terrorists	62	152	5	0.49	4.90	40.03	0.1396	2.50	[2]
Dolphins	62	159	8	0.26	5.13	34.90	0.1723	2.00	[3]
LesMiserables	77	254	5	0.57	6.60	79.53	0.0905	3.50	[4]
Email	167	3250	5	0.59	38.92	2508.78	0.0158	6.50	[5]
Jazz	198	2742	6	0.62	27.70	1070.24	0.0266	4.25	[6]
Celegans	297	2148	5	0.29	14.04	365.70	0.0399	5.75	[7]
NetSci	379	914	17	0.74	1.15	9.22	0.1424	2.00	[8]
U.S. Flights	500	2980	7	0.62	11.92	641.12	0.0189	8.00	[9]
Protein	1458	1948	19	0.07	2.08	14.85	0.1632	2.25	[10]
Facebook	4039	88234	8	0.61	43.69	4656.14	0.0095	4.75	[11]
PowerGrid	4941	6594	46	0.08	2.67	10.33	0.3483	1.50	[7]

TABLE S1. Structural properties of all the datasets analyzed. The different columns are the number of nodes and links N and L, the diameter D, the global clustering C, the first and second moment of the degree distribution $\langle k \rangle = 1/N \sum_i k_i$ and $\langle k^2 \rangle = 1/N \sum_i k_i^2$ and the epidemic threshold β_c; the last two columns are the upper-critical value β_u above which ViralRank outperforms all the other metrics and the data source, respectively.

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[4] Donald Ervin Knuth, *The Stanford GraphBase: a platform for combinatorial computing*, Vol. 37 (Addison-Wesley Reading, 1993).

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