Simulation 1 - Nodes Cannot Die

Testing Diameter: Graphs, Subgraphs and Edge Probability

Erdos-Renyi Graphs

index	pn	order	size	density	cluster coefficient	diameter	nodes deg ≥ n	largest component
0	1	143	117	0.011523687580025609	0.0	inf	0	97
1	3	143	325	0.032010243277848911	0.03655788655788656	7	0	143
2	5	143	527	0.051905840638235001	0.05108083447244284	5	14	143
3	7	143	757	0.074559243573328077	0.0733257571774318	4	49	143
4	9	143	885	0.087166354771988572	0.08693534635371428	4	87	143
5	11	143	1111	0.10942578548212351	0.1088499366852766	3	128	143

Table 1: Simulation 1: Graph properties for different probabilities *pn* of edge existence between nodes in Erdos-Renyi graphs

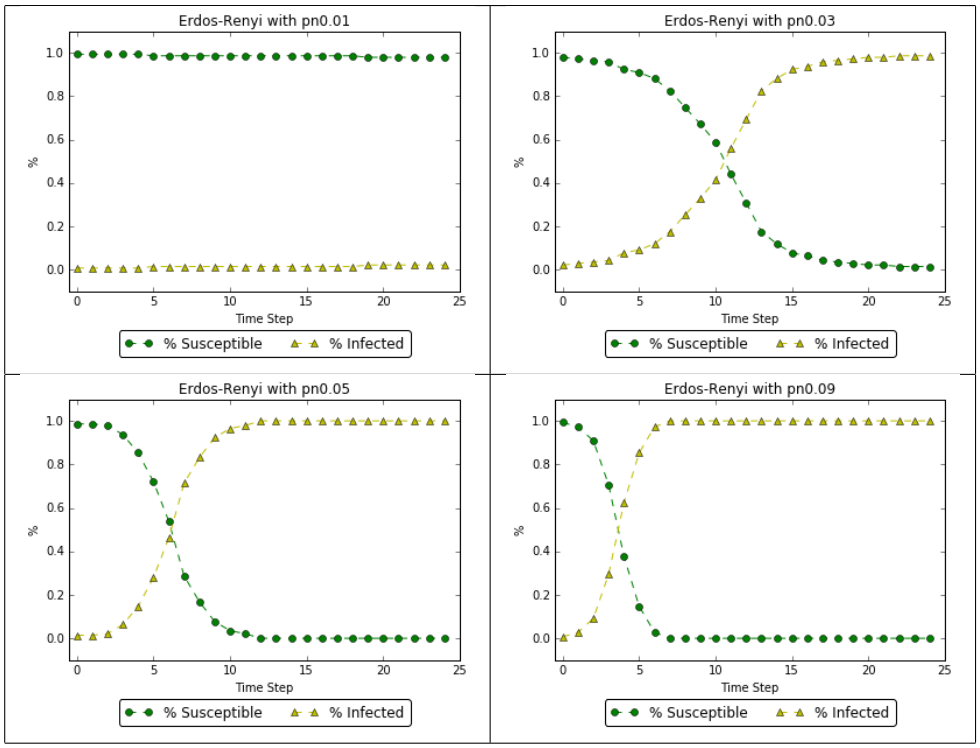

Figure 1: Simulation 1 Erdos Renyi : Plotting Node States for Graphs for pn = 0.01, 0.03, 0.05, 0.09

Real Airport Graph and Subgraphs

Name	order	size	density	cluster coefficient	diameter	nodes deg $\geq$ n	largest component
Real World Graph	143	1452	0.14301191765980498	0.6410089238208931	4	73	143
Largest Edge Weights	13	10	0.12820512820512819	0.0	inf	1	7
Lowest Edge Weights	27	102	0.29059829059829062	0.6458430700260764	3	13	27
20 Largest Deg. Cent.	20	177	0.93157894736842106	0.9423609156581293	2	20	20
Min Span. Tree	143	142	0.013986013986013986	0.0	8	3	143

Table 2: Real World Airport graph and subgraphs graph properties

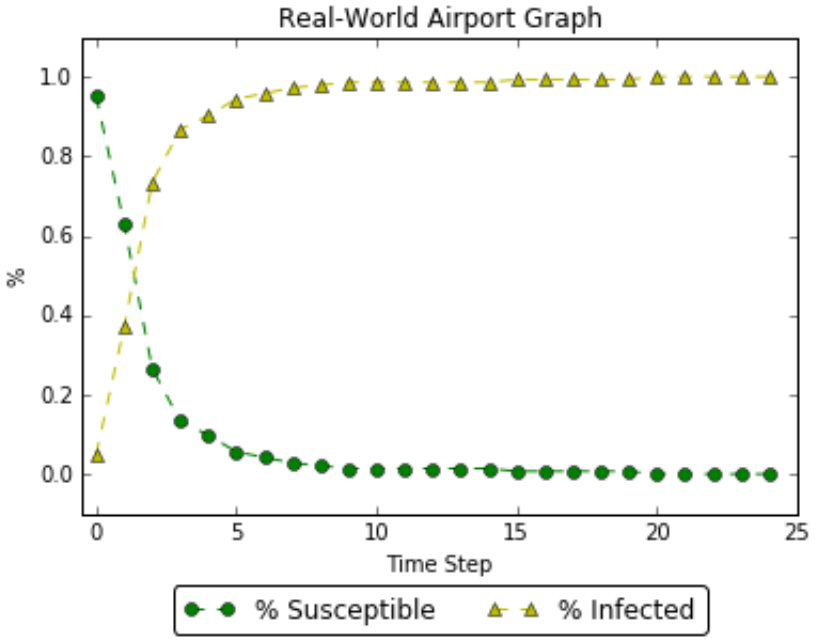

Figure 2: Simulation 1 Real-world : Airports graph properties

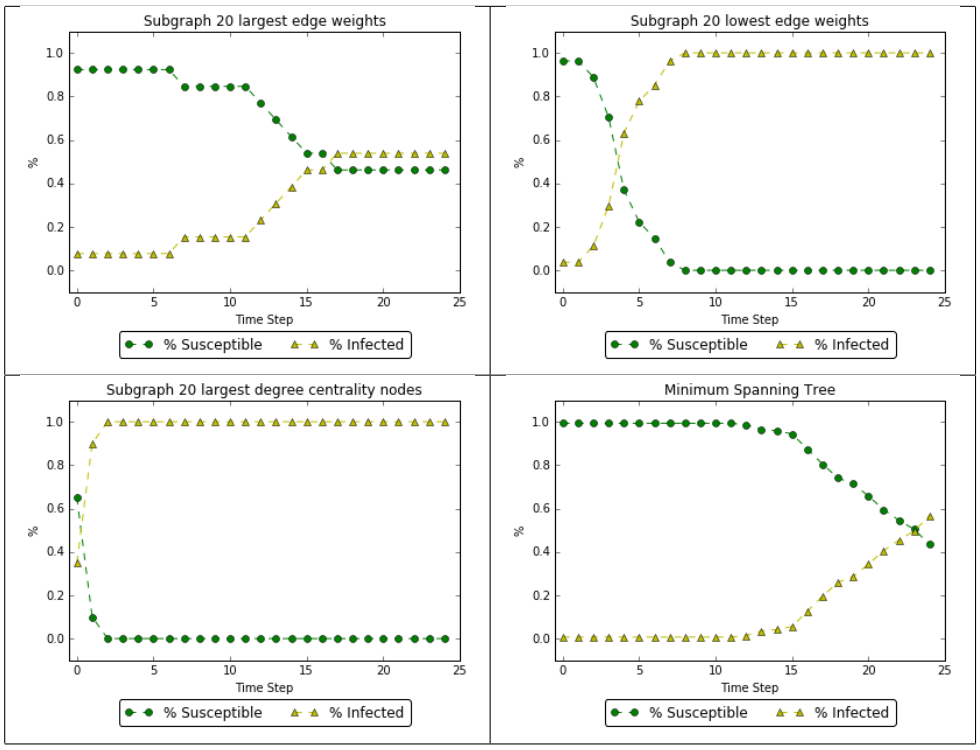

Figure 3: Simulation 1 Real-world : Subgraph node state plots

Source Node Centrality

Erdos-Renyi Graph with p = 0.09

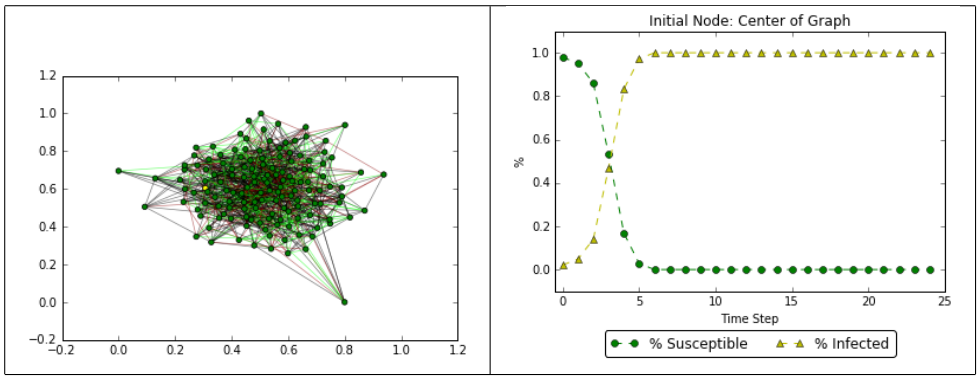

Figure 4: Simulation 1 Erdos-Renyi : Initial Node Center Of Graph

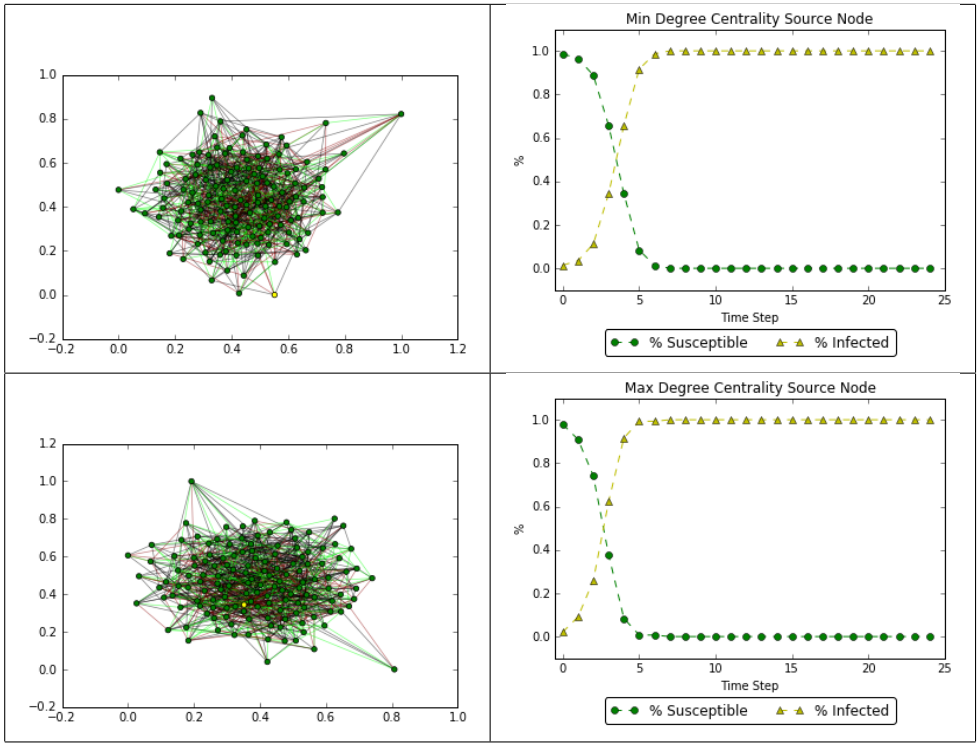

Figure 5: Simulation 1 Erdos-Renyi : Max and Min Degree Centrality SourceNode

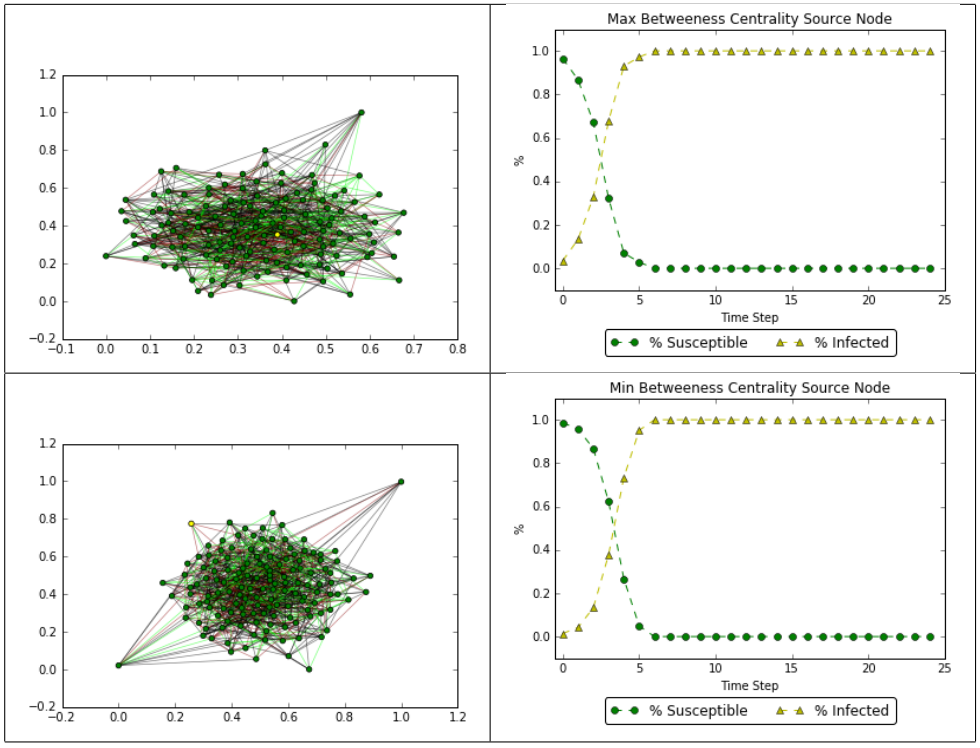

Figure 6: Simulation 1 Erdos-Renyi : Max and Min Betweenness Centrality SourceNode

Real World Graph

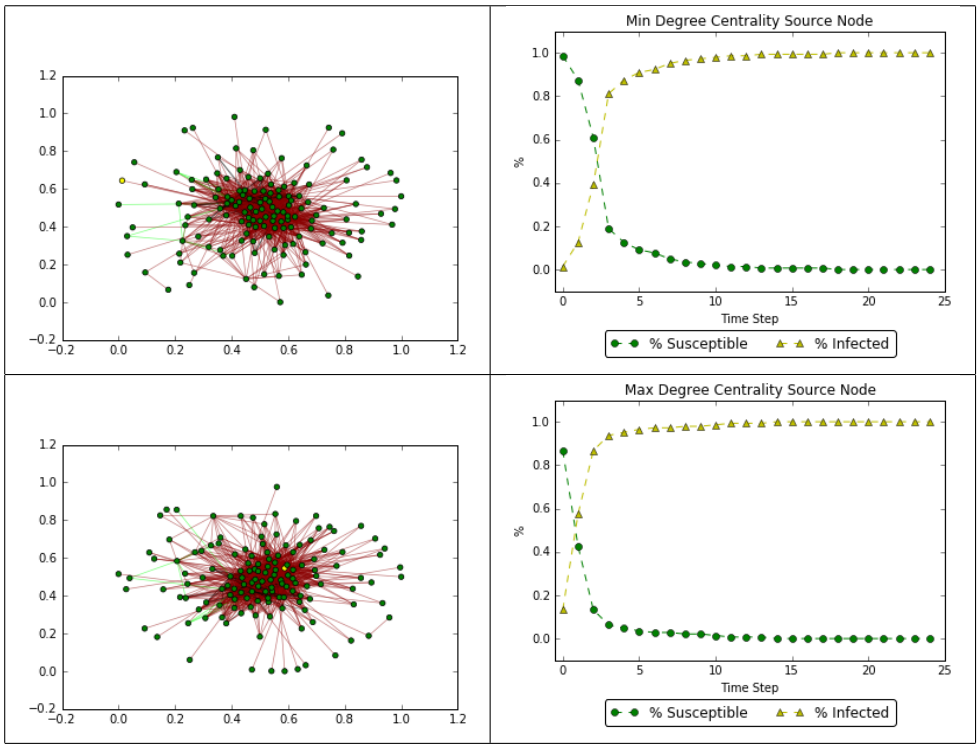

Figure 7: Simulation 1 Real : Max and Min Degree Centrality SourceNode

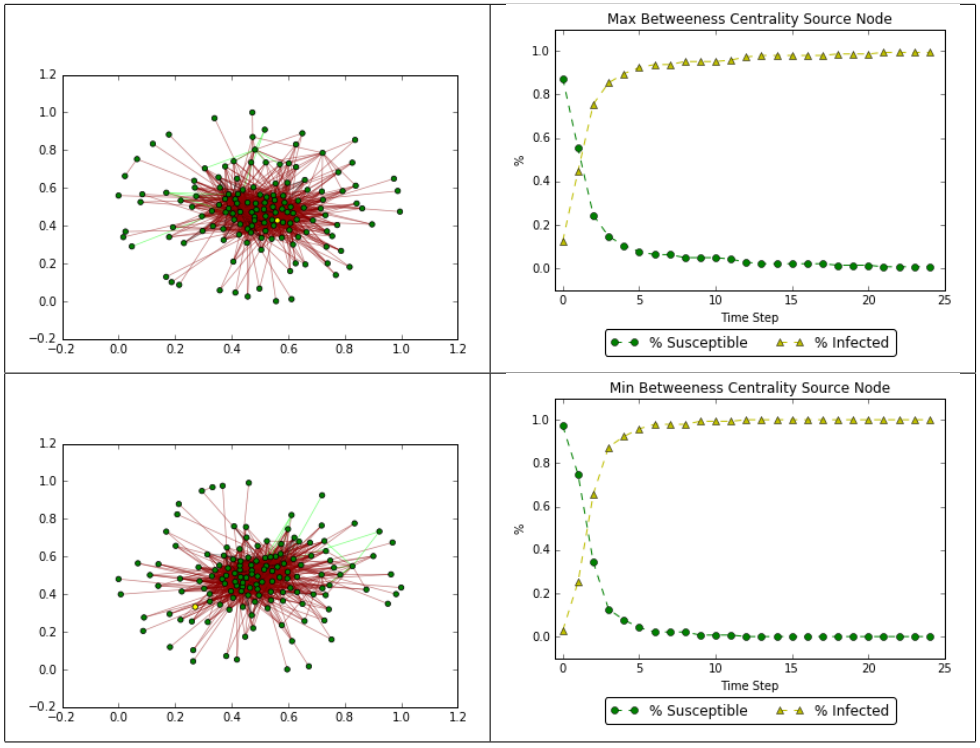

Figure 8: Simulation 1 Real : Max and Min Betweenness Centrality SourceNode

Simulation 2

Erdos-Renyi Graphs

index	pn	order	size	density	cluster coefficient	diameter	nodes deg $\geq$ n	largest component
0	1	143	103	0.010144784792672116	0.008857808857808859	inf	0	81
1	3	143	310	0.030532847434255887	0.017199467199467203	inf	0	141
2	5	143	530	0.052201319806953611	0.045021276314982595	5	12	143
3	7	143	734	0.072293903279818772	0.07440109217101569	4	49	143
4	9	143	889	0.087560326996946714	0.09322985284361361	4	86	143
5	11	143	1162	0.1144489313503398	0.11609641591068731	3	128	143

Table 3: Simulation 2 Erdos Renyi : Graph properties for pn = 0.01, 0.03, 0.05, 0.09

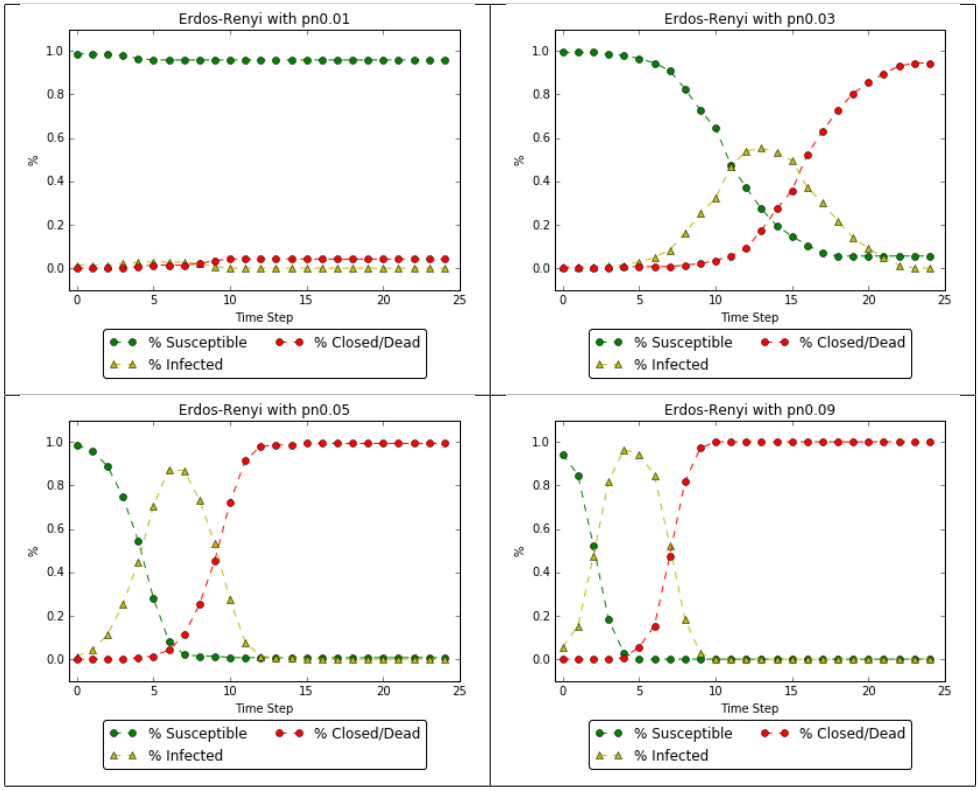

Figure 9: Simulation 2 Erdos Renyi : Plotting Node States for Graphs for pn = 0.01, 0.03, 0.05, 0.09

Real Airports Graph and subgraphs

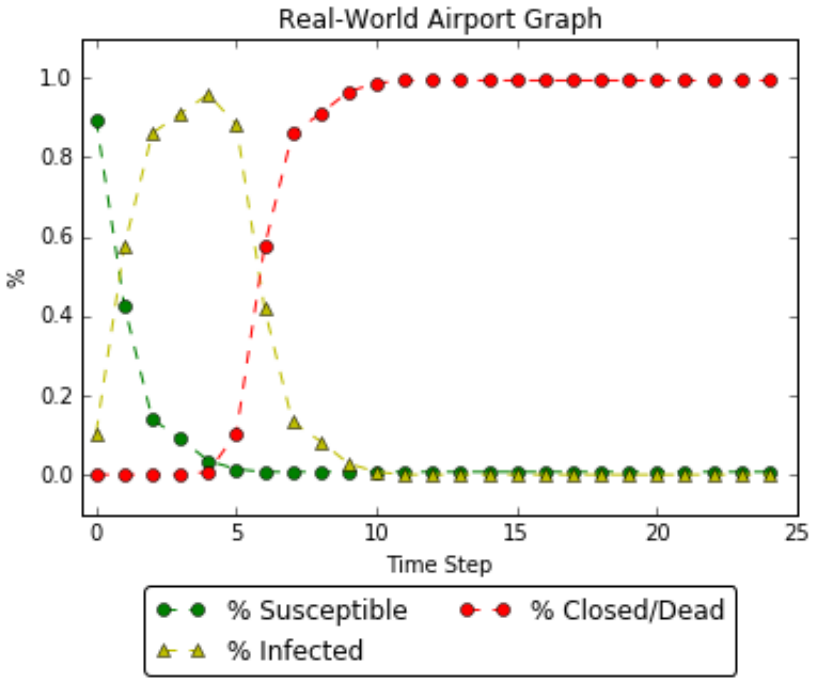

Figure 10: Simulation 2 Real-world : airport graph properties

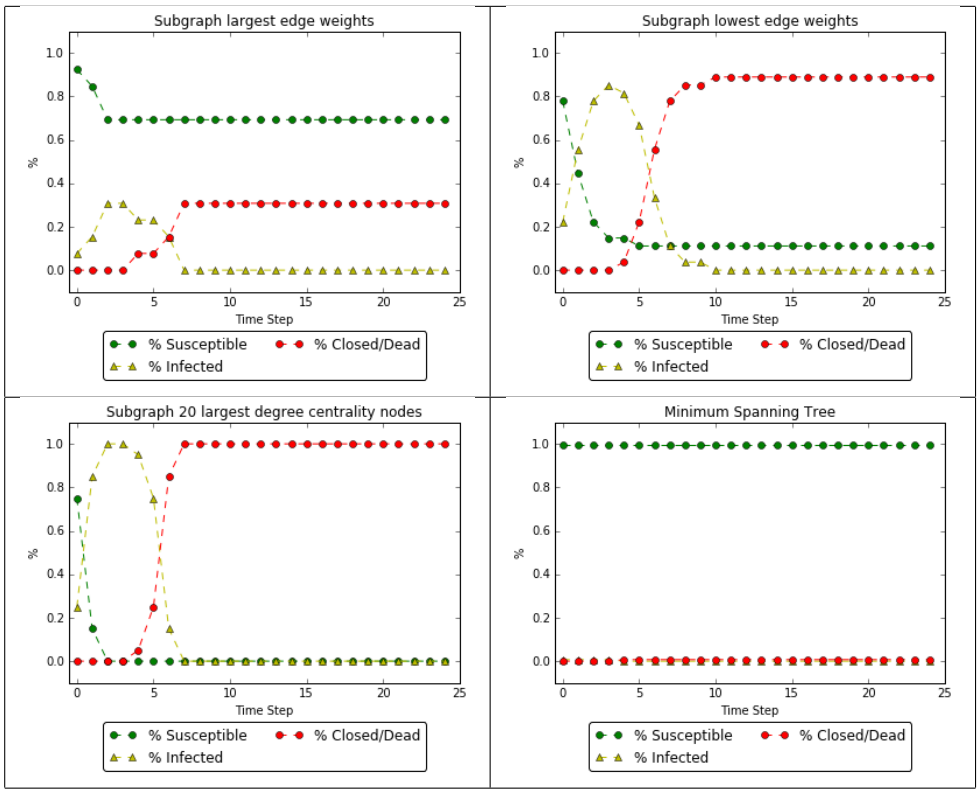

Figure 11: Simulation 2: Real-World Subgraphs

Source Node Centrality

Erdos-Renyi Graph with p = 0.09

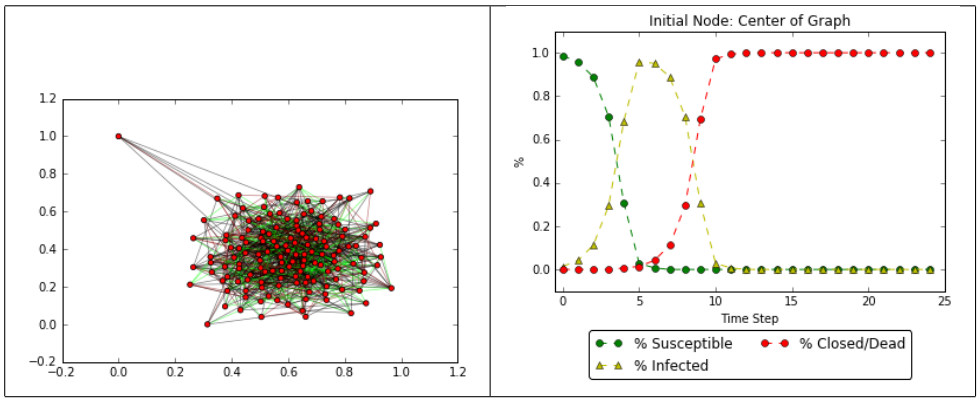

Figure 12: Simulation 2 Erdos-Renyi : Initial Node Center Of Graph

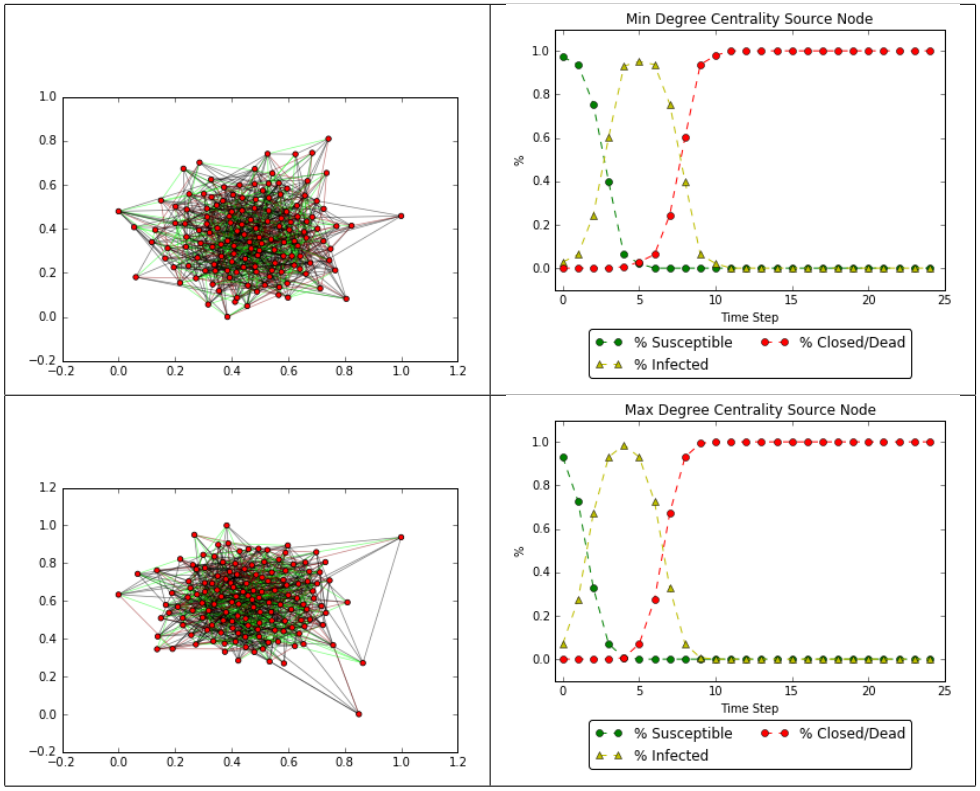

Figure 13: Simulation 2 Erdos-Renyi : Max and Min Degree Centrality SourceNode

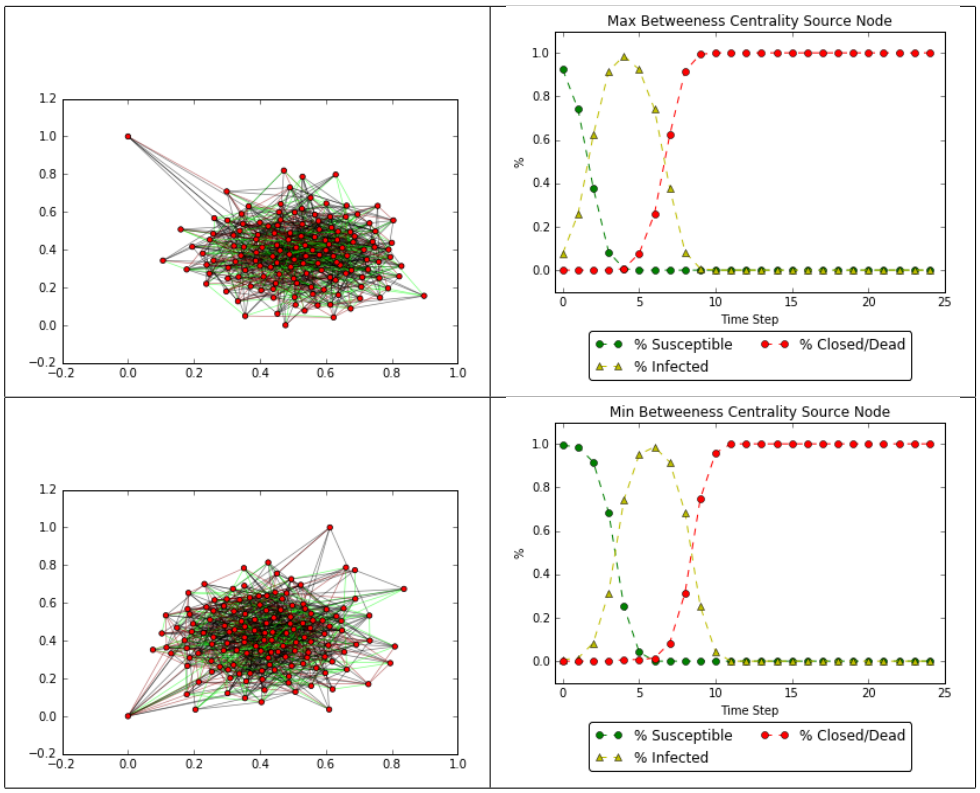

Figure 14: Simulation 2 Erdos-Renyi : Max and Min Betweenness Centrality SourceNode

Real World Airports Graph

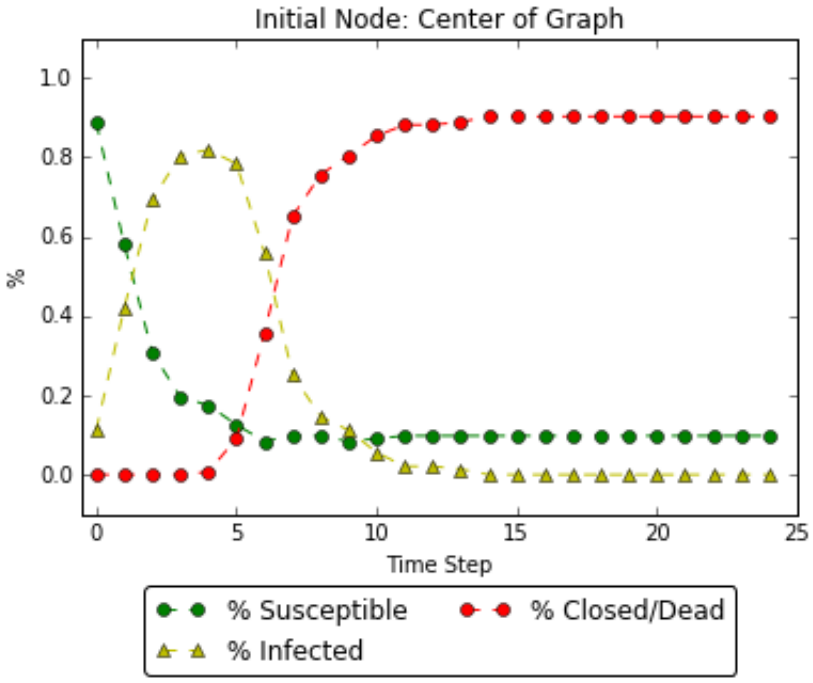

Figure 15: Simulation 2 Real-world : airport graph properties

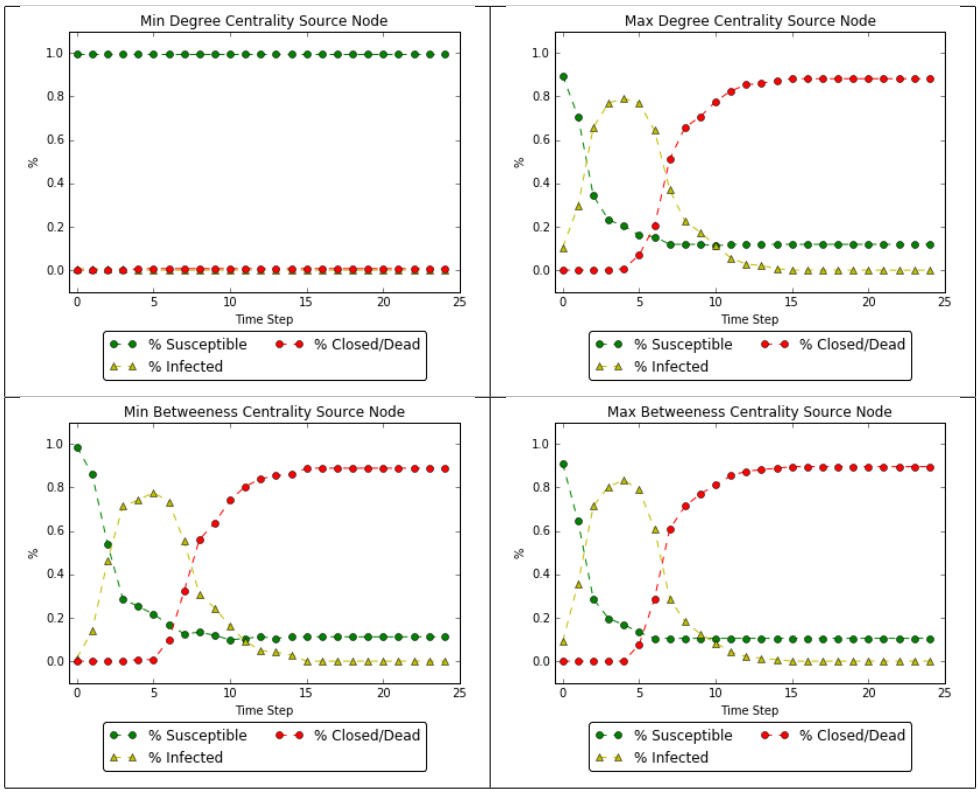

Figure 16: Simulation 2 Real : Max and Min Degree and Betweenness Centrality SourceNode