Sample solutions for the exercises A quick tour of IONTW

Sample solution for Exercise 1: With 120 nodes in a complete graph with an edge between each pair of the nodes, there are 7140 edges in total, too many to be distinguishable. \Box

Sample solution for Exercise 2: $E(K_4) = \{\{0,1\}, \{0,2\}, \{0,3\}, \{1,2\}, \{1,3\}, \{2,3\}\}$.

Sample solution for Exercise 3: No, because when N = 1, we get $K_1 = \overline{K}_1$. \Box

Sample solution for Exercise 4: (a) If $N \ge 2d + 1$, then $k_i = 2d$. If N < 2d + 1, then $k_i = N - 1$.

(b) $|i - j| \le d$ or $N - |i - j| \le d$. Here, *i* and *j* are the numbers of the nodes that you see after clicking **Labels**. \Box

Sample solution for Exercise 5: Actually, the nodes in the corners have degree 8, as is shown in the Network Metrics plot. However, in the graph of the World window, some edges overlap, so that one cannot distinguish them just by observing the graph. For example, both $\{0,1\}$ and $\{0,2\}$ are edges in this graph that do not show up as distinct objects in the World window. \Box

Sample solution for Exercise 6: $G_1 = (\{0, 1, 2, 3, 4, 7, 8\}, \{\{0, 3\}, \{0, 7\}, \{1, 7\}, \{2, 4\}, \{2, 7\}, \{3, 8\}\}). \square$

Sample solution for Exercise 7: Change

num/frac: 2 min-deg: 4 Then click New. \Box

Sample solution for Exercise 8: To analyze the data, first compute the overall statistics for part (c) on the duration of outbreaks by analyzing the output column with the header ticks. Then sort the output column with the header count turtles with [removed?] from smallest to largest and compute the proportions for (a) and (b). Finally, remove all rows with simulations where some hosts escaped infection and compute the statistics for (d).

In our experiment, there were 27 simulations in which only 1 host experienced infection, 1 simulation in which 2 hosts experienced infection, 1 simulation in which 5 hosts experienced infection, 3 simulations in which 9 hosts experienced infection, and 468 simulations in which all 10 hosts experienced infection. Thus,

(a) The proportion of outbreaks during which at least some hosts escaped infection was (27 + 1 + 1 + 3)/500 = 0.064.

(b) The proportion of outbreaks during which no secondary infections whatsoever occurred was 27/500 = 0.054.

(c) The minimum, maximum, and mean durations of all outbreaks were 0.001736, 9.261946 and 2.889893 respectively.

(d) The minimum, maximum, and mean durations of all those outbreaks during which all hosts experienced infection were 0.892822, 9.261946 and 3.076228 respectively. \Box