Exercise Sheet #1

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This exercise sheet will be discussed in the first tutorial. You should bring your results, but no points will be given/counted.

1 Graphs

1. The graph given in Fig.1 shows an abstraction of a part of the Frankfurt public transport network. Evaluate:

   (a) coordination number z,

   (b) connection probability p,

   (c) network diameter l,

   (d) and clustering coefficient C.

   Compare the network diameter and clustering coefficient with the values you would expect for a random graph with the same coordination number.

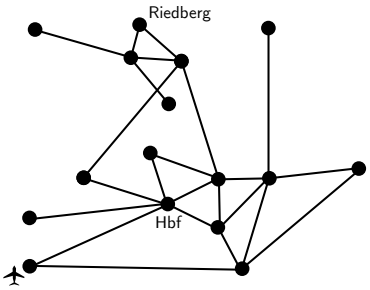

Figure 1: Graph with N=16 vertices

2 Stability Analysis

Consider the two-dimensional, first-order, homogeneous difference equation:

$$x(t+1) = x(t) + \frac{1}{2}y(t) \quad (1)$$

$$y(t+1) = x(t) + \frac{3}{2}y(t) \quad (2)$$

Draw the phase diagram with some relevant trajectories, find fixed points and analyse the stability.