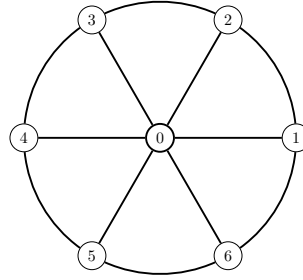


Internet Analytics (COM-308)

Homework Set 2

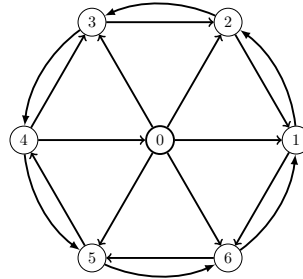
Exercise 1

(a) Consider the undirected graph G_1 (Figure 1). Find the stationary distribution of a random walk on this graph. Which node has the highest visiting probability?



Undirected graph G_1

(b) Consider the directed graph G_2 (Figure 2). This graph is a directed version of graph G_1 . Does the random walk also possess a stationary distribution on G_2 ? If yes, compute it. Which node has the highest visiting probability? If no, justify why.



Directed graph G_2

(c) Verify whether the stationary distribution π for the directed graph G_2 is proportional to the node in-degrees or/and out-degrees?

Exercise 2

The conductance Φ of a graph measures how well different node subsets are connected to their complements. We saw in class that this has connections to the mixing time of a random walk on the graph.

We want to gain some intuition about this measure through examples. For this, assume n is even and compute the conductance of the following three graphs:

- (a) the cycle C_n .
- (b) the complete graph K_n .
- (c) two copies of $K_{n/2}$ connected by a single edge.