Discrete Mathematics
Practice Class 2
13-02-2024

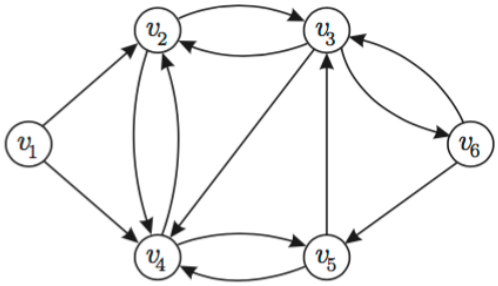
Problem 1. Consider a graph with 8 edges and 5 vertices. This graph has 4 vertices with degree 3.
(i) Compute the degree of the last vertex.

(ii) Draw with MaGraDa an undirected graph with those properties and without loops. Draw this graph here.

Problem 2. Consider a simple graph with 15 edges, 3 vertices of degree 4, and all others of degree 3. How many vertices does the graph have?

Problem 3. Consider a simple graph with 5 edges, and suppose the graph only has vertices of degree 3 and vertices of degree 2. How many vertices of each degree does the graph have?

Problem 4. Consider the directed graph G:



Answer the following questions. Justify your answers.

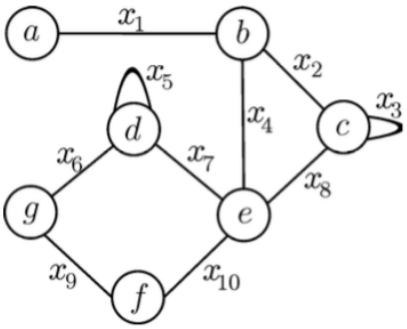
(i) Introduce that graph in Magrada introducing the adjacency matrix. Write this matrix here:

(ii) Using that matrix compute the outdegree of the vertex v_3.

(iii) Using that adjacency matrix compute the number of walks of length 2 from v_4 to v_3.

(iv) Using that adjacency matrix compute $\Gamma(v)$ and $\Gamma^{-1}(v)$ for every vertex v in G.

Problem 5. Consider the following graph G:



(i) Compute the adjacency matrix A of the graph G.

(ii) Compute A^2 and explain what is the meaning of each element of this matrix.

(iii) Compute using the adjacency matrix the number of walks of length 3 from d to a.

(iv) Compute the incidence matrix of G.

(v) Write the incidence list of G.