L-29 Euler Graph

Wednesday, April 13, 2022 10:05 AM

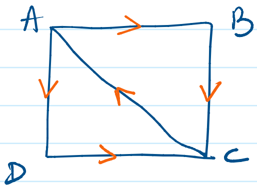
11.36. EULER PATH (OR CHAIN)

A simple path in a graph G is called Euler path If it Traverse every Edge of the graph Exactly Once.

An Euler path (or chain) through a graph is a path whose edge list contains each edge of the graph exactly once.

Euler Circuit :→ Closed Euler path.

Euler Graph Eulerian Graph : A graph which Contain either euler path or Euler Circuit is Called Euler graph.

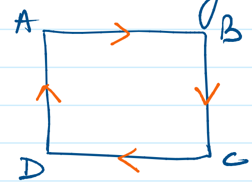


A — B — C — A — D — C

A — B — C — D — A — C

Euler Path

Euler graph.



A — B — C — D — A

Euler Circuit (Closed Euler path)

Euler Graph

① A Connected graph G is an Euler graph Iff the degree of every Vertex is Even, and it Contain an Euler Circuit.

② A Connected graph G is an Euler graph, having Euler path iff Exactly Two Vertices has odd degree.

Hamilton Path / Hamiltonian Path

A hamilton path in a Connected graph G is the path which Contain every Vertex of the graph Exactly once.

Hamilton Circuit : Closed H-Path.

Hamiltonian Graph: A graph is said to be H-Graph If it Contain either H-path or H-Circuit.

Note: ① If G has n-Vertices then H-Circuit will Contain n-Edges.

② " " " " " " H-path will " (n-1) Edges.

③ There may be more than One H-path & H-Circuit in graph.

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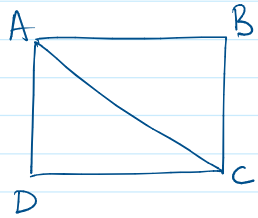


$n = 4$

$B \xrightarrow{1} C \xrightarrow{2} D \xrightarrow{3} A$ — H-path

Length = 3

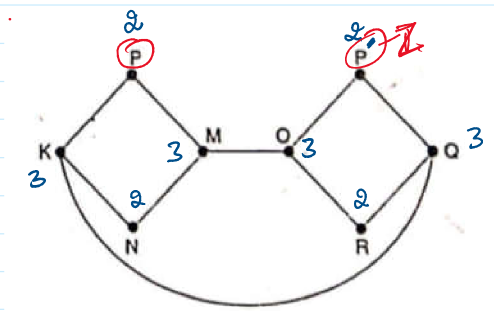
No. of Edges = 3 = 4−1 (n−1)

$C \xrightarrow{1} D \xrightarrow{2} \cancel{A} \xrightarrow{3} B \xrightarrow{4} C$ — H-Circuit

Length = 4

No. of Edges = 4 = n

④ If No. of Edges in a graph $G < (n-1)$, n = No. of Vertices then the graph is Not an H-graph.



More than 2 odd Vertices

Not Euler

Ⓐ Hamilton ✓

Ⓑ Euler.

P — M — N — K — Q — R — O — P′

Theorem V. *Prove that a simple graph with k-components and n vertices can have at the most of* $\frac{(n-k)(n-k+1)}{2}$ *edges.* (P.T.U., M.C.A. Dec. 2006)

Let $G = \{V, E\}$ be a connected graph, then cardinality of cut set of G is called edge connectivity of graph G.

The edge connectivity of a connected graph cannot be more than the smallest degree of a vertex in the graph. It is denoted as $\lambda(G)$

Vertex connectivity

Let G be a connected graph. Vertex connectivity of a graph is the least number of vertices whose removal disconnects the graph. It is written as K(G) and is given by

$$K(G) = n - 1$$

for a complete graph with n vertices