Семінар 15. Ізоморфізм графів

19 червня 2023

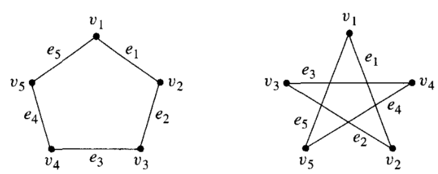


Figure 11.4.1

Call this graph G. Now consider the graph G' represented in Figure 11.4.2.

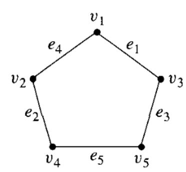
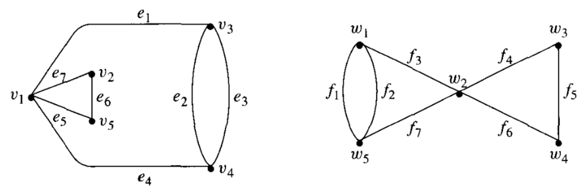


Figure 11.4.2

• Definition

Let G and G' be graphs with vertex sets $V(G)$ and $V(G')$ and edge sets $E(G)$ and $E(G')$, respectively. ***G* is isomorphic to *G'*** if, and only if, there exist one-to-one correspondences $g\colon V(G) \to V(G')$ and $h\colon E(G) \to E(G')$ that preserve the edge-endpoint functions of G and G' in the sense that for all $v \in V(G)$ and $e \in E(G)$,

$$v \text{ is an endpoint of } e \quad \Leftrightarrow \quad g(v) \text{ is an endpoint of } h(e). \qquad 11.4.1$$

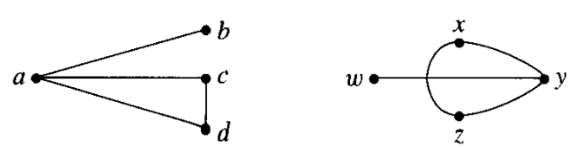


G $\qquad\qquad$ G'

• Definition

If G and G' are simple graphs, then **G is isomorphic to G'** if, and only if, there exists a one-to-one correspondence g from the vertex set $V(G)$ of G to the vertex set $V(G')$ of G' that preserves the edge-endpoint functions of G and G' in the sense that for all vertices u and v of G,

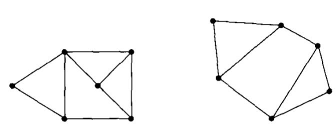
$$\{u, v\} \text{ is an edge in } G \quad \Leftrightarrow \quad \{g(u), g(v)\} \text{ is an edge in } G'. \qquad 11.4.2$$



G $\qquad\qquad$ G'

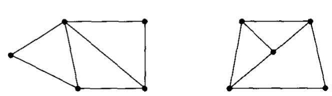
Show that the following pairs of graphs are not isomorphic by finding an isomorphic invariant that they do not share.

a.



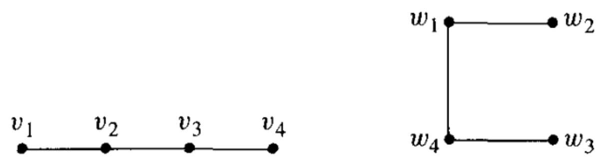
G $\qquad\qquad$ G'

b.



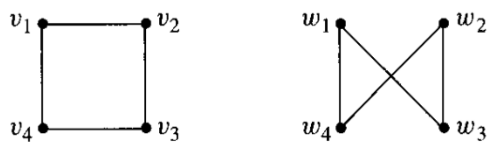
H $\qquad\qquad$ H'

6.



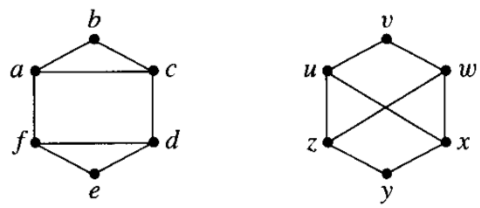
G G'

7.



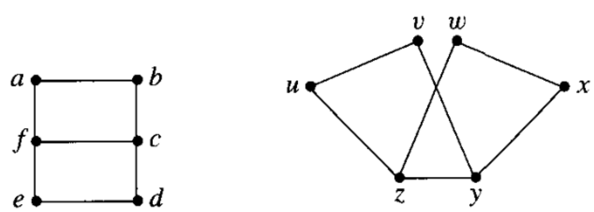
G G'

8.



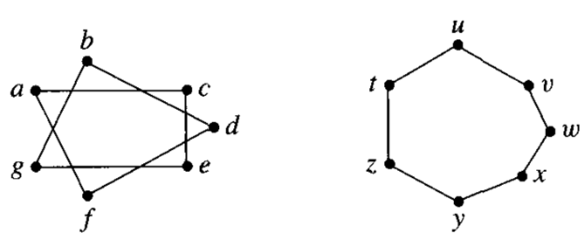
G G'

9.



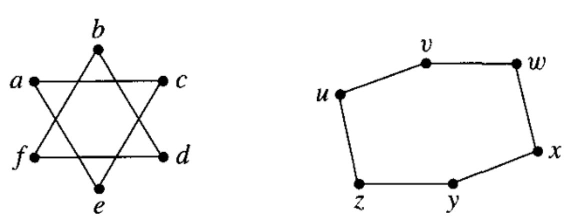
G G'

10.



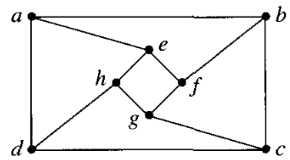
G G'

11.

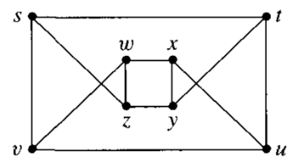


G G'

12.

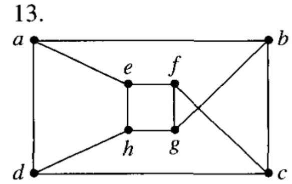


G

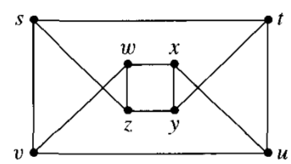


G'

13.



G



G'

14. Draw all nonisomorphic simple graphs with three vertices.