

Polynomial Time Algorithm for Graph Isomorphism Testing (V6 corrections)

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Definition 1. Vertex $v \in V$ of a graph $G = (V, E)$ and vertex $v' \in V'$ of a graph $G' = (V', E')$ are *similar*, if for some isomorphism π of G onto G' , $\pi(v) = v'$. \square

Definition 1. Vertices v, w are *similar*, if one of the following conditions holds:

- 1) $w = \alpha(v)$; $v, w \in V(G)$;
 - 2) $w = \pi(v)$; $v \in V(G)$; $w \in V'(G')$;
- where α is automorphism of graph G ;
 π is isomorphism of G onto G' .

Corollary 3. If $G \cong G'$, vertices $v, w \in V$ and $v', w' \in V'$ are similar respectively, then $\text{dist}(v, w) = \text{dist}(v', w')$. \square

Corollary 3. If $G \cong G'$, vertices $v, w \in V$ and $v', w' \in V'$, $\pi(v) = v'$, $\pi(w) = w'$, where π is isomorphism, then $\text{dist}(v, w) = \text{dist}(v', w')$.