

# On the Graph Isomorphism Problem

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## abstract

Motivated by Babai's recent breakthrough, a **quasi-polynomial time algorithm for the graph isomorphism problem**, I shall describe the unique position of this problem within the computational complexity hierarchy. In particular, I will show why the problem is believed not to be NP-complete, and how it is possible to give short proofs that two graphs are NOT isomorphic. Some non-trivial special cases of the problem that have polynomial-time algorithms will be mentioned. I will also talk about the relationship of the problem with permutation groups and the string isomorphism problem.

Graph Isomorphism GI  
Given  $X, Y$  graphs,  $X \cong Y$  ?

1979 B. Babai exp. time  
1980 Laks bounded degree  $\rightarrow$   
1983 Laks-Zemlyachko exp.  
1983 Laks  $\exp(\sqrt{\ln n \ln n})$   
2008 B. Codenotti hyp.

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۱۴:۰۰ الی ۱۵:۰۰

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