1145-05-683   **Larry J. Gerstein*** (`gerstein@cox.net`). *A new approach to the graph isomorphism problem.* Preliminary report.

Graphs G and H with adjacency matrices A and B are isomorphic if and only if there is a permutation matrix P such that $B = P^{-1}AP$. Thus, similarity of A and B is a necessary condition for isomorphism of G and H. On the other hand, the inverse of a permutation matrix is its transpose, and therefore *congruence* of A and B via a unimodular matrix P is also a necessary condition for isomorphism of G and H. We will see that matrix non-congruence can demonstrate non-isomorphism even in situations where the associated adjacency matrices are similar. This approach can succeed even if A and B have the same invariant factors. (Received September 12, 2018)