



Why

We want to model the progressive fill-in during Gauss elimination with graphs.

Definition

Let $G = ((V, E), \sigma)$ be an ordered undirected graph with $|V| = n$. Define $E_0 = E$. The *elimination edge sequence* of G is a sequence (E_1, \dots, E_{n-1}) defined by

$$E_i = E_{i-1} \cup \{\{v, w\} \mid v \succ \sigma(i), w \succ \sigma(i), \text{ and } \{\sigma(i), w\} \in E_{i-1}\}$$

for $i = 1, \dots, n - 1$. The difference between E_{i-1} and E can be described by saying that the higher neighborhood of the intermediate graph $((V, E_{i-1}), \sigma)$ is made complete by the addition of edges between all non-adjacent vertices.

The *elimination graph* of G is the graph $((V, E_{n-1}), \sigma)$.

