

## **ELIMINATION GRAPHS**

## 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  $(E_1, \ldots, E_{n-1})$  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, ..., 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  $((V, E_{n-1}), \sigma)$ .

