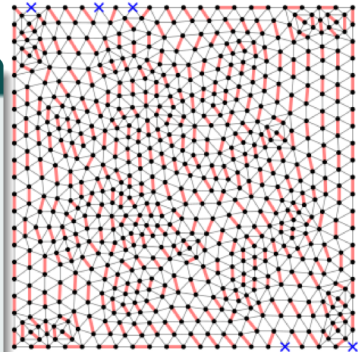


## AMG based on weighted graph matching

Given a graph  $G = (\mathcal{V}, \mathcal{E})$  (with adjacency matrix  $A$ ), and a weight vector  $\mathbf{w}$  we consider the weighted version of  $G$  obtained by considering the weight matrix  $\hat{A}$ :

$$(\hat{A})_{i,j} = \hat{a}_{i,j} = 1 - \frac{2a_{i,j}w_iw_j}{a_{i,i}w_i^2 + a_{j,j}w_j^2},$$

- a *matching*  $\mathcal{M}$  is a set of pairwise non-adjacent edges, containing no loops;
- a **maximum product matching** if it maximizes the product of the weights of the edges  $e_{i \rightarrow j}$  in it.



To increase regularity of  $P_l$  we can consider a **smoothed prolongator** by applying a Jacobi step.