

**A**



$$\mathbf{A} = \mathbf{X}\mathbf{D}\mathbf{Y}^T$$



$$\mathbf{A} = \mathbf{U}\mathbf{\Sigma}\mathbf{V}^T$$

**Phase 1: compute Rank Revealing Decomp (RRD)**

**X, Y full column rank and "well-conditioned"**  
**D diagonal**

**Phase 2: compute SVD of an RRD**