**Reducing dimensionality by selecting first $k$ singular vectors:**

$$|V| \begin{bmatrix} & & \\ & \hat{X} & \\ & & \end{bmatrix}^{|V|} = |V| \begin{bmatrix} | & | & \\ u_1 & u_2 & \cdots \\ | & | & \end{bmatrix}^{k} \begin{bmatrix} \sigma_1 & 0 & \cdots \\ 0 & \sigma_2 & \cdots \\ \vdots & \vdots & \ddots \end{bmatrix}^{k} \begin{bmatrix} - & v_1 & - \\ - & v_2 & - \\ & \vdots & \end{bmatrix}^{|V|}$$