let $\underset{(n \times p)}{X} = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1p} \\ x_{21} & x_{22} & \cdots & x_{2p} \\ \vdots & \vdots & & \vdots \\ x_{n1} & x_{n2} & & x_{np} \end{bmatrix}$ data matrix w/ variables in columns

$\underset{(p \times p)}{S} = \text{cov}(X)$

$\underset{(p \times p)}{V} = \begin{bmatrix} \vec{v}_1 & \vec{v}_2 & \cdots & \vec{v}_p \end{bmatrix}$ matrix w/ eigenvectors of S columns

$\vec{l} = [l_1 \quad l_2 \quad \cdots \quad l_p]$ eigenvalues of S

Variance summarized by k^{th} PC: $\sqrt{l_k}$

PC scores matrix: $W = XV$

PC loadings matrix: $VL^{-\frac{1}{2}}$ where $L^{-\frac{1}{2}} = \begin{bmatrix} \sqrt{l_1} & & 0 \\ & \sqrt{l_2} & \\ 0 & & \sqrt{l_p} \end{bmatrix}$