

$$\mathbf{Q} = [\mathbf{v}_1, \dots, \mathbf{v}_n]$$

$$\mathbf{H} = \mathbf{Q}\mathbf{\Lambda}\mathbf{Q}^\top$$

Second derivative in direction \mathbf{d} :

$$\mathbf{d}^\top \mathbf{H} \mathbf{d} = \sum_i \lambda_i \cos^2 \angle(\mathbf{v}_i, \mathbf{d})$$