

$$\mathbf{u} = [34, 21]$$

$$\mathbf{v} = [21, 13]$$

$$\|\mathbf{u}\| = \sqrt{34^2 + 21^2} = \sqrt{1597}$$

$$\|\mathbf{v}\| = \sqrt{21^2 + 13^2} = \sqrt{610}$$

$$\mathbf{u} \cdot \mathbf{v} = 34 \cdot 21 + 21 \cdot 13 = 987$$

$$\cos(\widehat{\mathbf{u}, \mathbf{v}}) = \frac{\mathbf{u} \cdot \mathbf{v}}{\|\mathbf{u}\| \cdot \|\mathbf{v}\|} = \frac{987}{\sqrt{1597 \cdot 610}} = 0.9999994867\dots$$

$$\widehat{(\mathbf{u}, \mathbf{v})} = \arccos(0.9999994867\dots) = 0.001013\dots \text{ radians} = 0.058\dots^\circ$$

$$\text{proj}_{\mathbf{u}}(\mathbf{v}) = \left(\frac{\mathbf{u} \cdot \mathbf{v}}{\mathbf{u} \cdot \mathbf{u}}\right) \mathbf{u} = \frac{987}{1597} [34, 21] = [21.0131\dots, 12.9787\dots] \approx \mathbf{v}$$

