

(A) Rotation followed by a translation:

34e

Solve: $R_{\theta} v + a = v$ (guess this is a rotation)

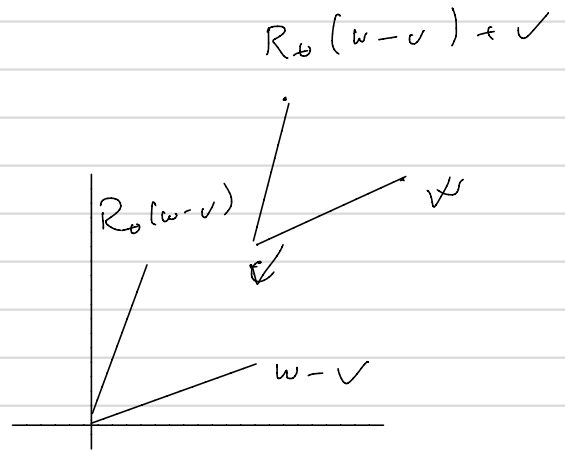
$$\text{get } v = (I - R_{\theta})^{-1} a$$

$(I - R_{\theta})$ is invertible.

Rotate w around v produces:

$$R_{\theta}(w - v) + v$$

why? $R_{\theta}(w) + a$



$$= R_{\theta}(w - v) + R_{\theta}v + a$$

$$= R_{\theta}(w - v) + R_{\theta}(I - R_{\theta})^{-1}a + a$$

$$= R_{\theta}(w - v) + (R_{\theta} - I)(I - R_{\theta})^{-1}a + (I - R_{\theta})^{-1}a + a$$

$$= R_{\theta}(w - v) - a + a + a = R_{\theta}(w - v) + v.$$

(B) Central reflection followed by a translation:

This is NOT a REFLECTION

Issue: $I - M_{\theta}$ is NOT invertible (M_{θ} 's eigenvalues are 1, -1)

Exercise: Show central reflections fix 2 lines:

a) The axis of reflection

b) The line \perp to that axis thru O .

SPECIAL CASE: The direction of translation is \perp to the axis of reflection.