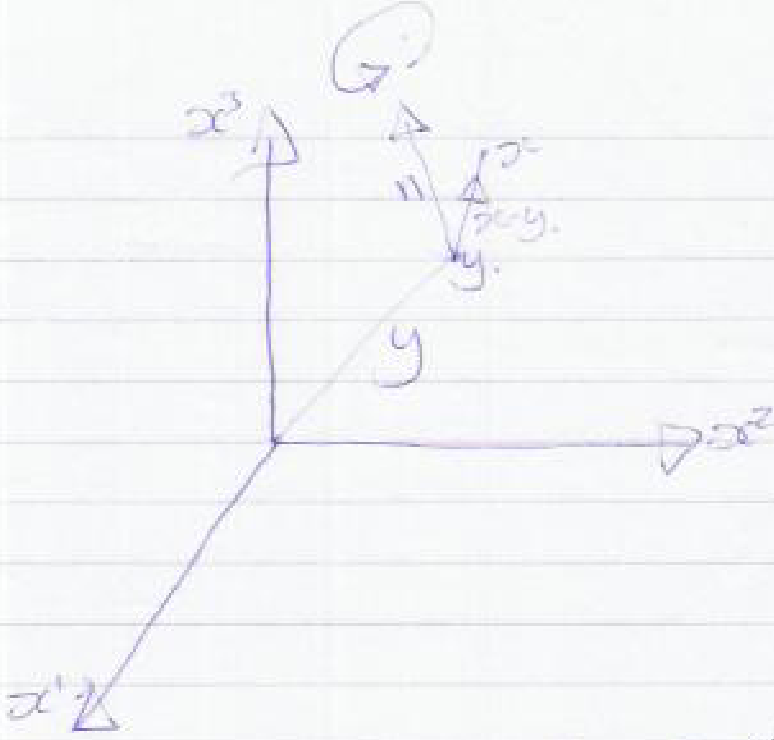

Rotations preserve lengths so that $|R_t(x-y)| = |x-y|$, and $\rho_t(y) = y + R_t(y-y) = y$, so ρ_t fixes the point y, so for all t $\rho_t(x)$ is a vector $R_t(x-y)$, of length $x-y$ attached at the point y. More over, we can resolve ~~x~~ $x-y$ into two parts: that part parallel to $\underline{n}$, and that part perpendicular to n. Call the parallel part $(x-y)_{\parallel}$, and the perpendicular part $(x-y)_{\perp}$.

R_t leaves n fixed, and any multiple of n, including $(x-y)_{\parallel}$, so $R_t((x-y)_{\parallel})$ is a vector length $|(x-y)_{\parallel}|$ attached at the point y in direction n. The length of $R_t((x-y)_{\perp})$ is also preserved, then Pythagoras theorem implies $(R_t(x-y)_{\perp})$ is perpendicular to $R_t((x-y)_{\parallel})$*, so $R_t(x-y)$ rotates the vector $(x-y)_{\perp}$ around the point of contact, $y + (x-y)_{\parallel}$, keeping it perpendicular to $(x-y)_{\parallel}$ i.e

*Since length $R_t(x,y)$ preserved