

10.1 - Projections of a curve

1. Consider the curve given by $\vec{r}(t) = t\hat{i} - \frac{\sqrt{3}}{2}t^2\hat{j} + \frac{1}{2}t^2\hat{k}$.

Sketch all three planar projections.

Hint: When you're sketching $z(t)$ vs $y(t)$, it may be useful to think of t^2 as the parameter. Call it $t^2 = s$ and sketch $z(s)$ vs $y(s)$. But because t^2 can never be negative, s can only take on positive values.

Can you visualize the entire curve by looking at the projections? [Check yourself by using GeoGebra's `Curve([x(t), y(t), z(t), t, t_min, t_max].)`]

2. Consider the curve described by $\vec{\mathbf{r}}(t) = \langle t \cos t, t \sin t, t \rangle$. Sketch all three planar projections. Can you visualize the entire curve by looking at the projections? [Check yourself by using `Curve(...)`.]