

Due: February 15

Collaborators

Name

Directions: Be sure to follow the guidelines for writing up projects as specified in the course information sheet (passed out on the first day of class). Whenever appropriate, use in-line citations, including page numbers and people consulted when you present information obtained from discussion, a text, notes, or technology. **Only write on one side of each page.**

“Civilization advances by extending the number of important operations which we can perform without thinking of them.” (Alfred North Whitehead)

Project Description

Do **both** of the following.

1. The paraboloid $2y = (x - 1)^2 + z^2$ and the plane $x + z = 1$ intersect along a curve in \mathbf{R}^3 . Find a parametrization $\vec{F}(t)$ for this curve.
 - (a) Extra Credit (5 points on the next exam): Carefully prove or disprove that this curve is a parabola.
2. Find the unit tangent, principal unit normal and unit binormal vectors for the circular helix

$$\vec{r}(t) = \cos(t) \hat{\mathbf{i}} + \sin(t) \hat{\mathbf{j}} + t \hat{\mathbf{k}}.$$