CS130 - Parametric functions

Name: _____ SID: _____

Given a parametric surface parameterized as $f(u,v) = \begin{pmatrix} u^2 - v^2 \\ 2uv \\ u^2 + v^2 \end{pmatrix}$ and a ray with endpoint $(-5, 1, 7)$ and direction $\begin{pmatrix} 2 \\ 1 \\ -2 \end{pmatrix}$.

1. Normalize the ray's direction.

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2. Compute the intersection location and distance along the ray. *Hint: note that $u \to -u$ and $v \to -v$ results in the same point, so we may assume that $u > 0$. Solve for u^2 to find u. Then, eliminate v.*

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3. Compute the normal direction for the surface at the intersection location.

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