Math 323 A Catalog of Quadric Surfaces

A: Ellipsoids These have equations of the form: $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$



B: Hyperboloids of One Sheet These have equations of the form: $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$





C: Hyperboloids of Two Sheets These have equations of the form: $-\frac{x^2}{a^2} - \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$

Traces:	Graph:
$z = 0: -\frac{x^2}{a^2} + -\frac{y^2}{b^2} = 1$	No Solution
$ z = c : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 0$	
$ z = k > c : \frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{k^2}{c^2} - 1$	
$y = 0: -\frac{x^2}{a^2} + \frac{z^2}{c^2} = 1$	
$x = 0: -\frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$	



D: Cones These have equations of the form: $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 0$





E: Paraboloid These have equations of the form: $\frac{x^2}{a^2} + \frac{y^2}{b^2} = cz$



F: Hyperbolic Paraboloid [Saddle] These have equations of the form: $\frac{x^2}{a^2} - \frac{y^2}{b^2} = cz$



