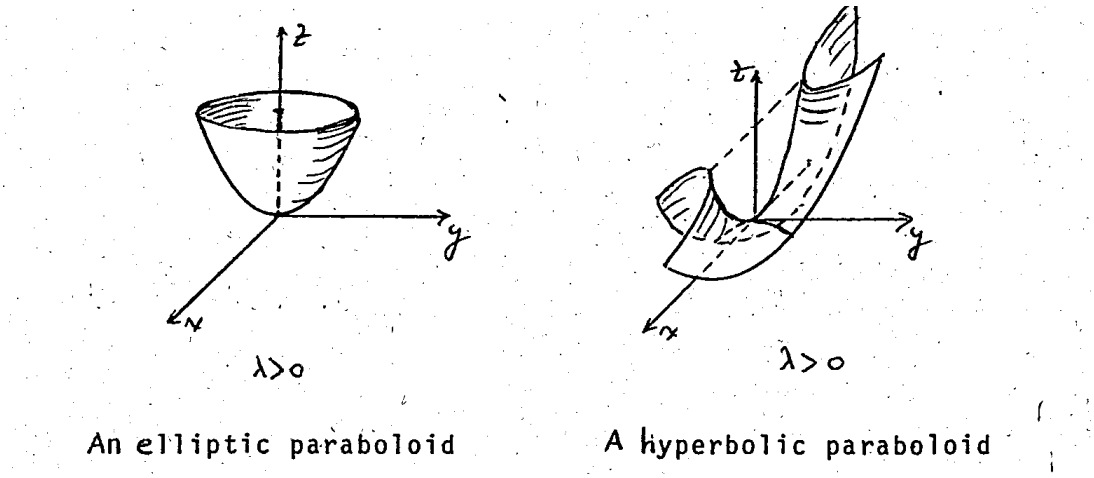
The cross sections of EP and HP for $x = k$ or $y = k$ are parabolas and ellipses (hyperbolas) for $z = k$ in EP (HP). Since sections are parabolas in two ways are called paraboloids. The third cross sections in EP(HP) being ellipses(hyperbolas) they are respectively called elliptic paraboloid (EP),hyperbolic paraboloid (HP).



An elliptic paraboloid A hyperbolic paraboloid

The origin in H_1 abd H_2 is called vertex. The hyperbolic paraboloid is of saddle shape in the neighborhood of the origin and the origin is called the saddle point of the surface, and the surface H_2 is sometimes called a saddle shape surface.

Similar results are obtained when x or y are linear instead of z.
The equations

$$\frac{(x-h)^2}{a^2} \pm \frac{(y-k)^2}{b^2} = \lambda(z-l)$$

represent clearly paraboloids having vertex at (h, k, z).

Example 0.1. Sketch

a)the sphere $(x+1)^2 + y^2 + (z-2)^2 = 4$