

$k = x^2 - y^2$  is a family of hyperbolic cylinders oriented vertically. The cross section of each level surface in the  $xy$ -plane is a hyperbola which cross the  $x$  - axis when  $k > 0$  and  $y$ -axis when  $k < 0$ . (When  $k = 0$ , the level surface is two intersecting vertical planes.)