Math290-2, Section 61
Example graph of surface

Example: Consider the function

$$F(x, y, z) = e^{-x^2-z^2} - y,$$

and tried to graph the level set $F(x, y, z) = 0$.

Answer: Considered cutting the level set along the planes $y = k$ for constants k. Since

$$0 < e^{-x^2-z^2} \leq 1$$

this only has solutions when $0 < k \leq 1$.

We now find some of these intersections, for a few values of k.

$y = k$	solution set
$y = 1$	the point $(0, 1, 0)$
$y = \frac{3}{4}$	$x^2 + z^2 = \ln \frac{4}{3}$
$y = \frac{1}{2}$	$x^2 + z^2 = \ln 2$
$y = \frac{1}{4}$	$x^2 + z^2 = 2 \ln 2$

Note that these are all circles.

The graph of $e^{-x^2-z^2} - y = 0$