Level Set Methods

Representing interfaces implicitly has many advantages from a computational point of view. The purpose of these notes is to attempt explain why the previous state must be true.

Level Set Functions

Let us begin with an example. Consider

\[ \phi(x, y) = \sqrt{x^2 + y^2} - \alpha \]

Then \( \{ \phi(x, y) = \alpha \} = \{ x^2 + y^2 = \alpha^2 \} \) closed in \( \mathbb{R}^2 \)

Further \( \{ \phi(x, y) < \alpha \} = \text{disk} \ (x, y) \in \mathbb{R}^2 \)

\[ \phi > 0 \]

\[ \phi < 0 \]

\[ \phi = 0 \]

In these notes, the interior region will always be shaded.