Once, to never forget, the derviation. Given a point x_i called the *initial estimate*, and a function $f(x)$, we can make an approximation x_u for x_0 s.t. $f(x_0) = 0$ by constructing the 1-st order approximation to f at x_i. The equation of this line, translated to $t = x - x_i$ is

$$l(t) = f(x_i) + tf'(x_i).$$

Solving for t_u s.t. $l(t_u) = 0$ gives $t_u = -f(x_i)/f'(x_i)$, or

$$x_u = u(x_i) = x_i - \frac{f(x_i)}{f'(x_i)}.$$

The function u can now be iteratively applied to refine the estimate.