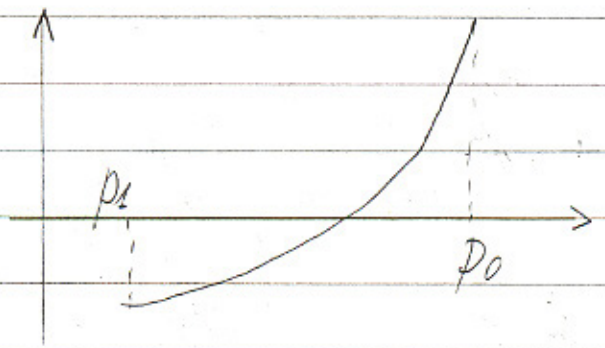
This formula for the method of false position only works if $f(x)$ is concave up or concave down

$$f''(x) = 2 + \frac{1}{x^2} > 0$$

Thus $f(x)$ is concave up

$$p_n = p_{n-1} - \frac{(p_{n-1} - p_0)\left[(p_{n-1}-2)^2 - \ln p_{n-1}\right]}{(p_{n-1}-2)^2 - \ln p_{n-1} - (p_0-2)^2 + \ln p_0}$$

Which endpoint should be used as a "false point"?



So the false point should be

$p_0 = 2$
$p_1 = 1$

Compute p_2 using the iteration above.

$$p_2 = 1 - \frac{(1-2)\left[(1-2)^2 - \ln 1\right]}{(1-2)^2 - \ln 1 + \ln 2}$$

$$p_2 = 1 - \frac{-[1]}{1 + \ln 2} = \frac{\ln 2 + 2}{\ln 2 + 1}$$