

Example. Solve the system:

$$\begin{cases} \sqrt{(x-x_1)+(y-y_1)} - \sqrt{(x-x_2)+(y-y_2)} - r_1 + r_2 = 0 \\ \sqrt{(x-x_1)+(y-y_1)} - \sqrt{(x-x_3)+(y-y_3)} - r_1 + r_3 = 0 \end{cases}$$

if $x_1 = 8, y_1 = 5, r_1 = 2.5;$

$x_2 = 1.5, y_2 = 1, r_2 = 1.5;$

$x_3 = 1.5, y_3 = 6, r_3 = 1.$

Record of calculations:

Interval = [3, 4.5].

$f(3, 3) = 3.8358740910271$

$f(3, 3.01) = 3.7974371832815$

$f(3, 3.02) = 3.7593469728775$

$f(3, 3.03) = 3.7216042590827$

$f(3, 3.04) = 3.6842098190414$

$f(3, 3.05) = 3.6471644079773$

$f(3, 3.06) = 3.6104687593933$

$f(3, 3.07) = 3.5741235852686$

$f(3, 3.08) = 3.5381295762528$

$f(3, 3.09) = 3.5024874018578$

$f(3, 3.1) = 3.4671977106459$

$f(3, 3.11) = 3.4322611304162$

$f(3, 3.12) = 3.3976782683876$

$f(3, 3.13) = 3.3634497113789$

$f(3, 3.14) = 3.3295760259868$

$f(3, 3.15) = 3.29605775876$

etc.

Answer:

$f_{\min} = 5.8988378031357E-6$

$x = 3.62$

$y = 3.83$

$r = 2.03$