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Assignment 1

The bisection-secant method have been implemented into the pool problem and the equation given. The condition to swap from one method to another is the following (as it was given in the slides):

$$\begin{cases} Use\ Bisection\ method\ if\ x^k < x^{bis} < x^{\sec} \\ Use\ Secant\ method\ if\ x^k < x^{\sec} < x^{bis} \end{cases}$$

As a result for the pool problem 1.4361rad has been obtained after 30 iterations with both methods. The coordinates for the two ball points and the radius of the pool have been randomly given:

$$\begin{matrix} xp = 0.8 & xq = -0.6 \\ yp = 0.2 & yq = 0.5 \end{matrix} \quad R = 1$$

The convergence is as fast as can be imagined with the interval of 0.01 rad given. Although the function is a trigonometric one, the graphic is quite regular and continuous. This is one of the reasons of the good result and precision.

The result for the proposed equation problem 2.9910 has been obtained after 49 iteration. But this result is not possible since as it is shown in the following figure, this point is in the other part of the asymptote.

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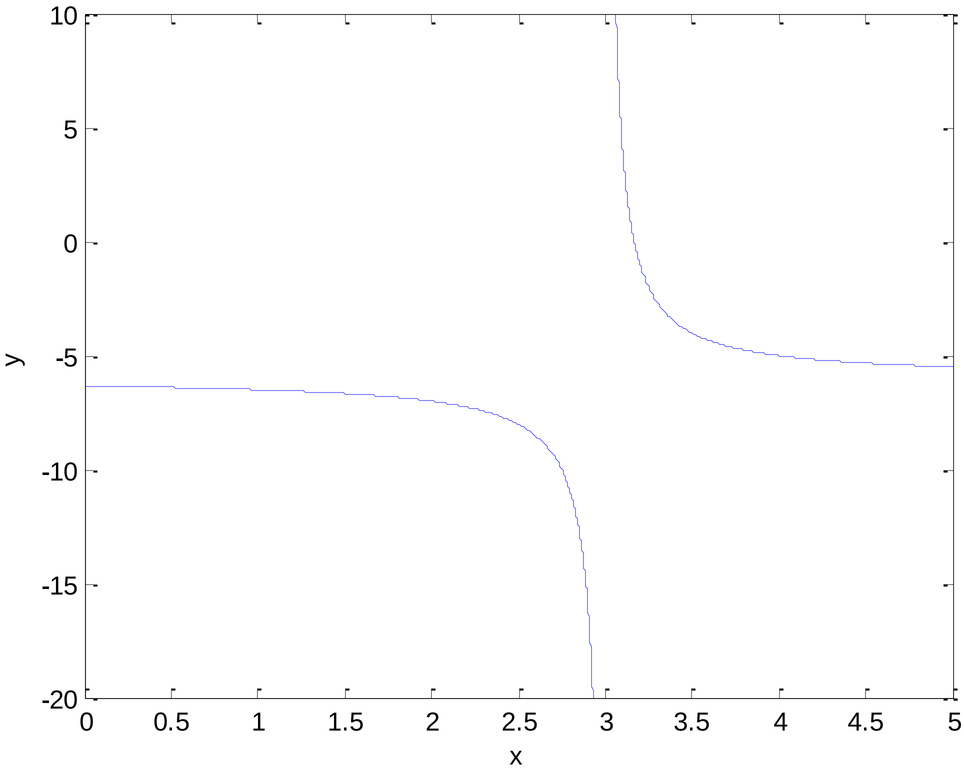

This is a function asymptotic which complicates a lot the iteration since one of the limits is really close to the final point but is in a high slope. This makes the iteration being a bit irregular and some errors can occur. As well as if the limit is not strongly fixed (it means being careful with the script that nothing happens in the other part of it) the iteration can jump to the other part. And in this case, it change completely the result.

As a conclusion of this part can be said that the final number is not a correct result. In addition a more defined script has to be created not to let the iteration pass the limit. The code had been checked a lot of times but I could not understand why the result was in the other part. Maybe different criteria for the methods or conditions to swap, or rules in the code have to be chosen.