MA332 Project 1

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1 Introduction

Newton's Method is a numerical root-finding algorithm. To find a root $f(x_\star) = 0$, the algorithm uses f, its derivative f', and some starting value x_0.

2 Failure to Converge

Depending on the function and starting value, Newton's Method may not converge.

3 Basins of Attraction

For a given root $f(x_\star) = 0$, the *basin of attraction* is the set of starting values x_0 for which Newton's Method will converge to $x_\star$.

3.1 Real-Valued Functions

Consider the function

$$g(x) = (x-1)(x+3)$$

3.2 Complex-Valued Functions

4 Discussion

Figure 1: Basins of convergence for $g(x) = (x-1)(x+3)$

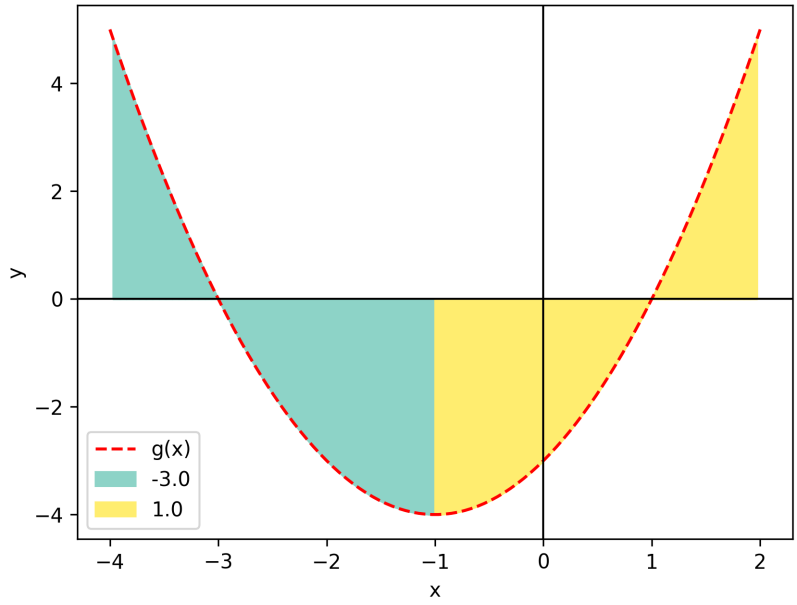

Figure 2: Basins of convergence for $g(x) = (x-4)(x-1)(x+3)$