

3 Assignment on «Visualization»

Problem 3.1. Consider some non-trivial function, e.g. a sum of a Bessel and Airy functions $f(x) = J_1(x) + \text{Ai}(-x)$. Find (numerically) its zeros and extrema and plot them combined with the function.

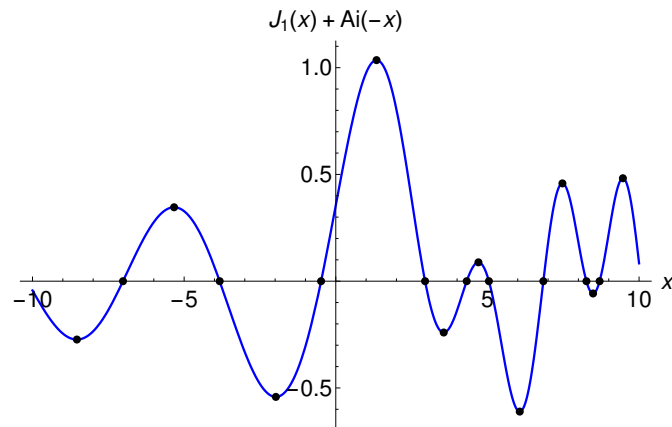


Figure 3.1: Illustration to the problem 3.1

Problem 3.2. Consider some analytic function of complex variable, e.g.

$$f(z) = \frac{z^4}{4} + \frac{z^2}{2} + e^{i\pi/3}z, \quad z \in \mathbb{C}.$$

Its real part $\text{Re } f(z)$ as a function of $z = x + iy$ has saddle points at $f'(z_0) = 0$ and the lines of steepest descent and ascent from this points may be found from condition $\text{Im } f(z) = \text{Im } f(z_0)$. Find all such points and corresponding curves and plot them combined as pictured below.

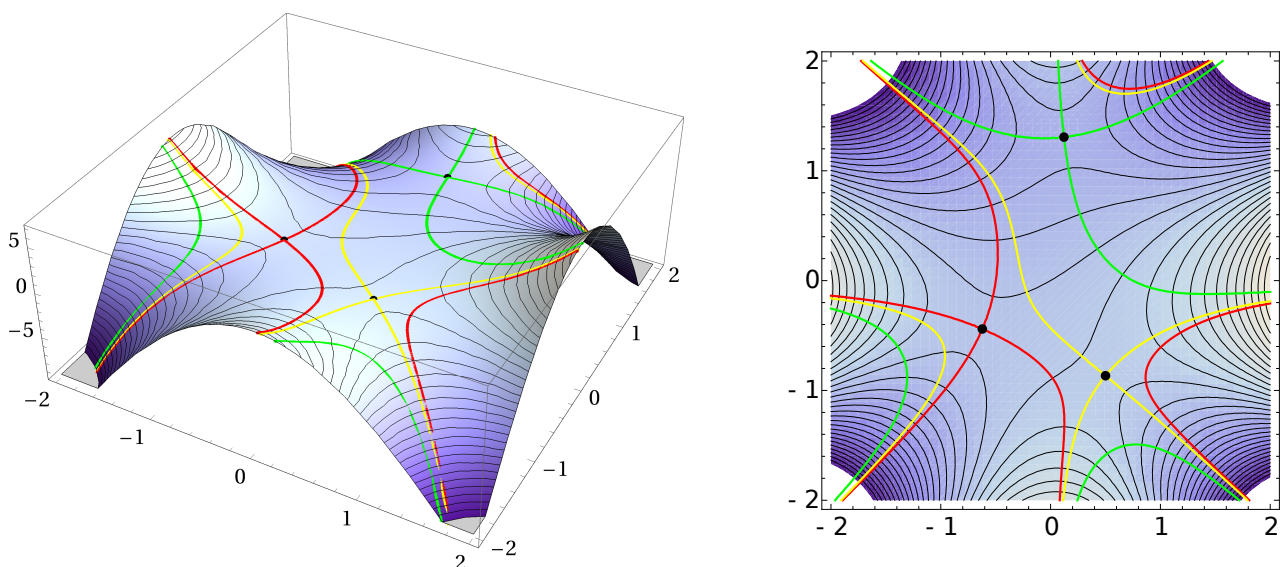


Figure 3.2: Illustration to the problem 3.2