EBA1180 Mathematics for Data Science
autumn 2024
Exercises

I came to the position that mathematical analysis is not one of the many ways of doing economic theory: it is the only way.

R. Lucas

Lecture 19 – 20
Sec. 7.1, 6.9, 8.6-7:
Implicit differentiation. The second order derivative, convex/concave functions.

Here are recommended exercises from the textbook [SHSC].

Section **7.1** exercise 1, 4, 6, 7a
Section **6.9** exercise 1-4
Section **9.6** exercise 1-4, 6a
Section **8.6** exercise 1-4

Problem Compute the expression for the derivative of $f(x)$.

a) $f(x) = \sqrt{x^2 - 7x + 13}$

b) $f(x) = xe^{0.1x^2}$

c) $f(x) = (2x + 5)^{100}$

d) $f(x) = \dfrac{\ln(x)}{x}$

Answers

Problem

a) $f'(x) = \dfrac{2x-7}{2\sqrt{x^2-7x+13}}$

b) $f'(x) = \dfrac{1}{5}(x^2+5)e^{0.1x^2}$

c) $f'(x) = 200(2x+5)^{99}$

d) $f'(x) = \dfrac{1-\ln(x)}{x^2}$