



BIOINFORMATICS II - SS 16

8. EXERCISE SHEET

TO BE DELIVERED NOT LATER THAN 19-06-2016

	Exercise	Points
Theoretical	1	10
Theoretical	2	10
Practical	3	10

Exercise 1: Fourier transform (10 Points)

Calculate explicitly the Fourier transform of the following functions:

$$f_1(x) = \sin(x) \quad x \in [-\pi, \pi]$$

$$f_2(x) = \cos(x) \quad x \in [-\pi, \pi]$$

$$f_3(x) = e^{-x} \quad x \in [0, 2]$$

Exercise 2: Convolution (10 Points)

Calculate explicitly the convolution of the following functions:

$$f_1(x) = \sin(x) \quad x \in [-\pi, \pi]$$

$$f_2(x) = \cos(x) \quad x \in [-\pi, \pi]$$

Discretize the signals with $N = 16$ and then calculate with pen and paper the convolution between the two functions.

Exercise 3: Fast Fourier transform (10 Points)

Calculate using the fast Fourier transform the solution to exercises 1 and exercise 2. Feel free to write your own C++ function, or use any library or BALL. If you write a function, quote the source.