Exercise Sheet Image Processing 6

Submission: 24.06.14 10:00

Exercise 1   Theory   (6 Points)

a) Explain the concept of aliasing. How can it be avoided?   (2 Points)

b) When can the Fast Fourier Transformation not be applied?   (1 Points)

c) What is the most appealing property seen of Fourier Transformations?
(1 Points)

d) You have an image 256x256 and want to implement an edge detector.
Which steps are required? Motivate the selected procedure.   (2 Points)

Exercise 2   Practice Discrete Fourier Transformation   (10 Points)

a) Apply the Discrete or Fast Fourier Transformation algorithm to the following functions. Explain why you chose a specific algorithm and report all your steps.

$$
\begin{aligned}
f(0) &= 1 \\
f(1) &= -0.5 \\
f(2) &= -0.5
\end{aligned}
$$

Table 1: Function 1

$$
\begin{aligned}
f(0) &= 0.5 \\
f(1) &= 0.5
\end{aligned}
$$

Table 2: Function 2

(10 Points)

Exercise 3   Practice Power spectrum   (4 Points)

a) Compute the power spectrum of the following function:

$$f(x) = \frac{3A}{4} sin(\pi Bx) \tag{1}$$

(4 Points)