Abgabe - Übungsblatt [8]

Einführung in die Computergraphik und Visualisierung

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First Exercise

In computer graphics low-pass filters are used for smoothing. For example, low-pass filters can calculate the average of a pixel and all its neighbors. The result of calculation replaces the original value of the pixel. The process is applied for every pixel in the given image. As a result, the original image becomes blurred. Low-pass filters are implemented using Fourier transforms.

Second Exercise

Bandlimited signal is the result of provided discrete convilution, therefore, it's impracticable.

Third Exercise

Nyquist frequency is half of the sampling rate of a discrete signal processing system. With the given sampling rate, the low-pass filter eliminates all frequency components above the Nyquist frequency.

Fourth Exercise

The theorem of Whittaker-Shannon-Kotelnikov states that each function $F(t)$, consisting of frequencies from 0 to $f1$, can be continuously transmitted with an arbitrary accuracy by numbers, that follow each other with interval of $\frac{1}{2f1}$ seconds.