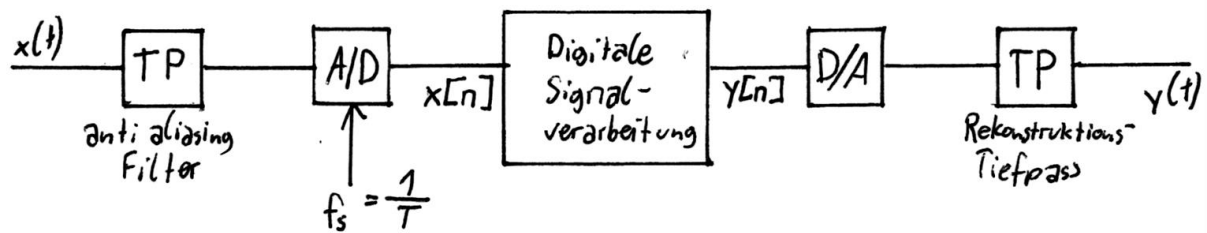


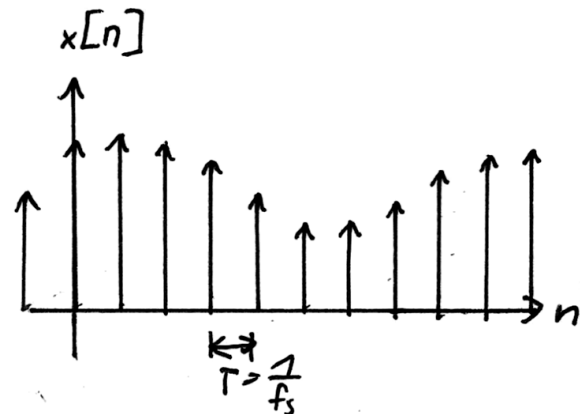
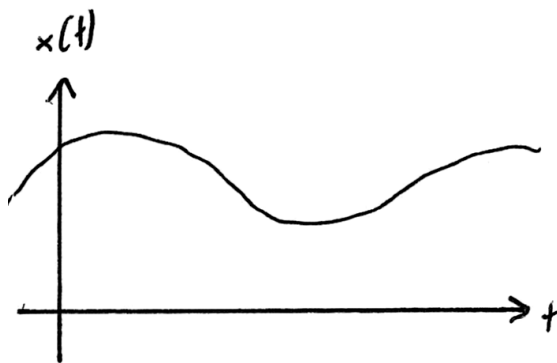
Zeitdiskrete Systeme und Signale



f_s ... sampling frequency, Abtastfrequenz

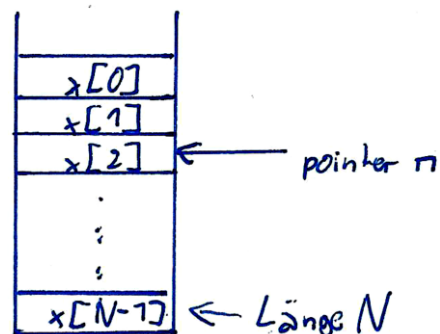
T ... Abtastzeit

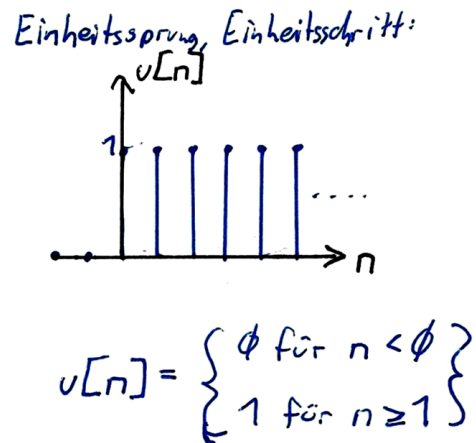
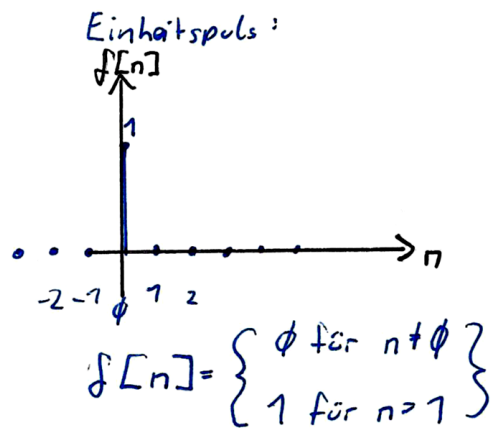
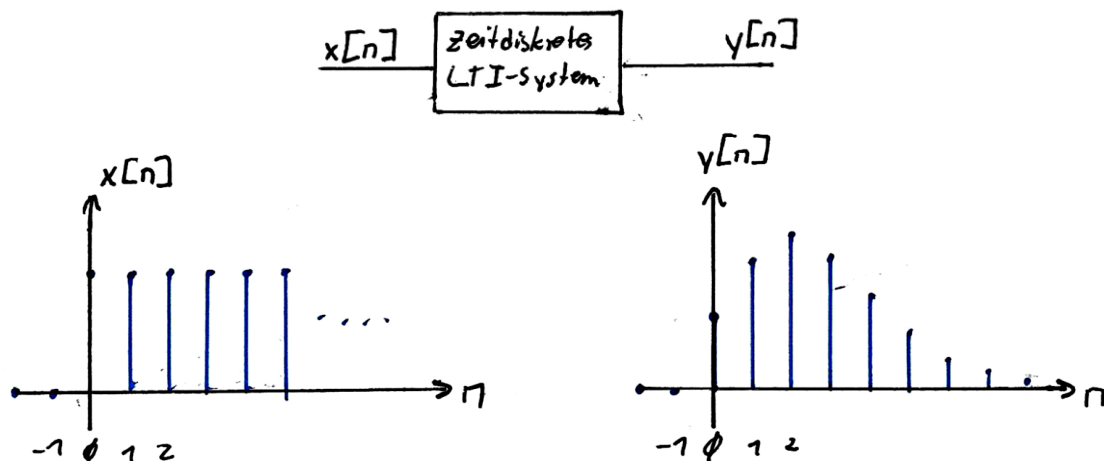
$x[n]$ ← zeitdiskretes Signal



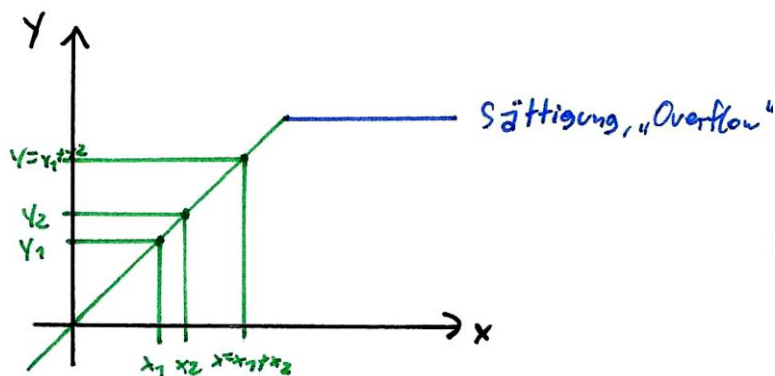
$x[0], x[1], x[2], \dots$

Speicher:



Elementare Signale:**Lineare invariante diskrete Systeme**(linear time invariant, LTI System)Linearität:

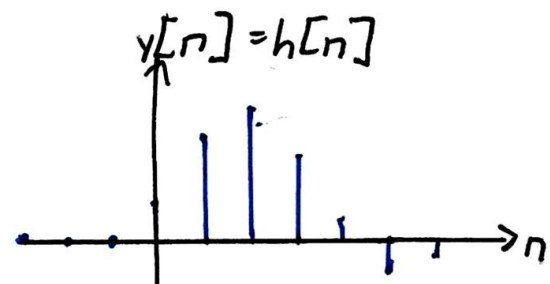
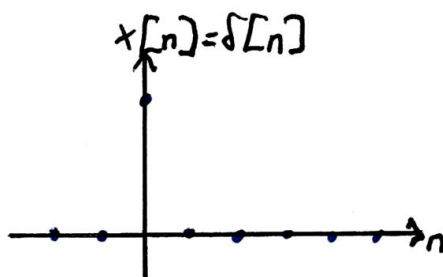
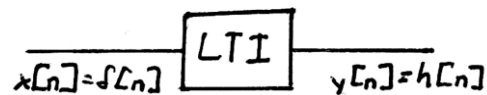
$$x[n] = k_1 x_1[n] + k_2 x_2[n] \Rightarrow y[n] = k_1 y_1[n] + k_2 y_2[n]$$

 $k_1, k_2 \dots$ Konstanten $x_1[n], x_2[n] \dots$ beliebiges Eingangssignal

Zeitinvarianz:

$$x[n-i] \rightarrow y[n-i]$$

Ein System ist Zeitinvariant, wenn ein um i Abtastintervalle verzögertes Eingangssignal $x[n-i]$ ein um i Abtastintervalle verzögertes Ausgangssignal $y[n-i]$ bewirkt.

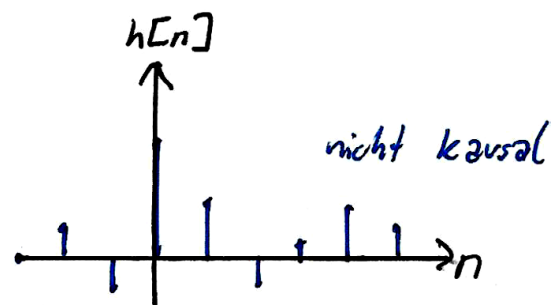
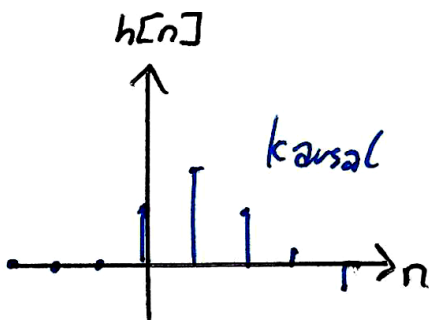
Impulsantwort:

Die Impulsantwort $h[n]$ ist eine Beschreibungsmöglichkeit eines zeitdiskreten LTI-Systems.

Kausalität:

Ein zeitdiskretes LTI-System heißt kausal, wenn seine Impulsantwort kausal ist:

$$h[n] = 0 \text{ für } n < 0$$

Stabilität:

Ein zeitdiskretes LTI-System heißt stabil, wenn seine Impulsantwort absolut summierbar ist:

$$\sum_{n=-\infty}^{\infty} |h[n]| < \infty$$

