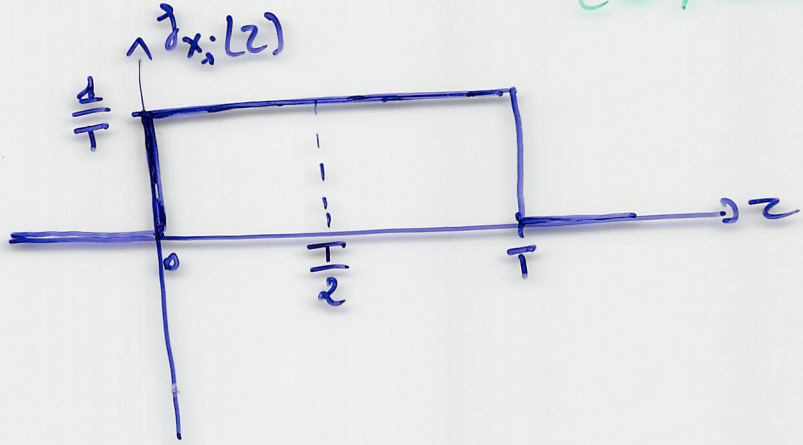
Zusatzaufgabe 15.1

stochastisch unabhängige ZV x_i
stetige Gleichverteilung im Intervall $[0,T]$

$$z_2 = x_1 + x_2$$
$$z_3 = x_1 + x_2 + x_3 = z_2 + x_3$$

stetige Gleichverteilung im $[0,T] \Rightarrow f_{x_i}(x_i) = \begin{cases} \frac{1}{T}, & 0 \le x_i \le T \\ 0, & \text{sonst} \end{cases}$

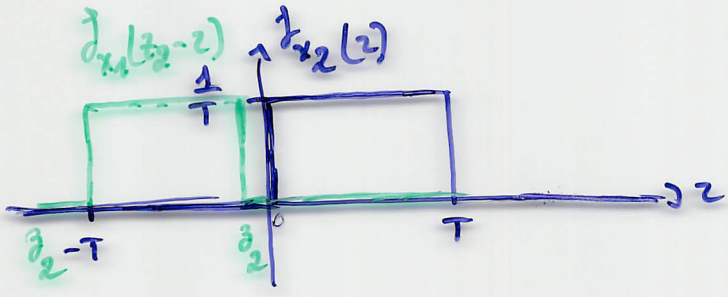
$$\mu_{x_i} = \frac{T}{2}$$
$$\sigma_{x_i}^2 = \frac{T^2}{12}$$
$$\Rightarrow \sigma_{x_i} = \frac{T}{2\sqrt{3}} = \sqrt{3}\cdot\frac{T}{6}$$



$\Rightarrow$ **$z_2 = x_1 + x_2$:**

$$f_{z_2}(z_2) = f_{x_1}(z_2) * f_{x_2}(z_2) = \int_{-\infty}^{+\infty} f_{x_1}(z_2 - z)\cdot f_{x_2}(z)\,dz$$

(15.16) S. 170



$z_2 \le 0$: $f_{z_2}(z_2) \equiv 0$ ||

$0 < z_2 \le T$: $f_{z_2}(z_2) = \int_0^{z_2} f_{x_1}(z_2 - z)\cdot f_{x_2}(z)\,dz$

$$= \int_0^{z_2} \frac{1}{T}\cdot\frac{1}{T}\,dz$$

$$f_{z_2}(z_2) = \frac{1}{T^2} z_2 \;||$$