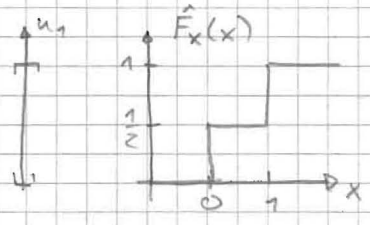
16.03.10

II:

- $\hat{f}_x(x) = \int_0^1 \hat{f}(x,y)\,dy$ ⇒

$\hat{f}_x(0) = \int_0^1 1-y\,dy = \frac{1}{2}$, $\hat{f}_x(1) = \int_0^1 y\,dy = \frac{1}{2}$

(→ use algorithm for DRV



x_s from u_1

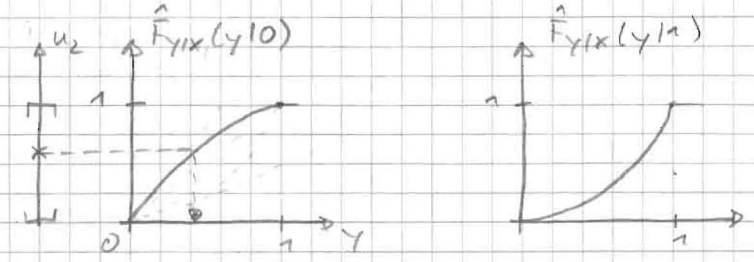
$\hat{F}_x(x_s-1) < u_1 \leq \hat{F}_x(x_s)$

- $\hat{f}_{Y|x}(y|x) = \frac{\hat{f}_{x,y}(x,y)}{\hat{f}_x(x)} = 2\,\hat{f}_{x,y}(x,y)$

- cdf: $\hat{F}_{Y|x}(y|x_s) = 2\int_0^y \hat{f}_{Y|x}(\tilde{y}|x_s)\,d\tilde{y}$ (x_s fixed; y CRV)

$\hat{F}_{Y|x}(y|0) = 2\int_0^y 1-\tilde{y}\,d\tilde{y} = 2\left[\tilde{y} - \frac{1}{2}\tilde{y}^2\right]_0^y = 2y - y^2$

$\hat{F}_{Y|x}(y|1) = 2\int_0^y \tilde{y}\,d\tilde{y} = y^2$



y continuous: $u_2 = \hat{F}_{Y|x}(y_s|x_s)$, solve for y_s

For $x=0$: $u_2 = 2y_s - y_s^2 \Leftrightarrow y_s^2 - 2y_s + u_2 = 0$

$\Leftrightarrow y_s = 1 \mp \sqrt{1-u_2} = 1 - \sqrt{1-u_2}$

For $x=1$: $u_2 = y_s^2 \Leftrightarrow y_s = \sqrt{u_2}$

[matlab: jointPDF2 → 2nd implementation
script_jointPDF → run