

# Rechnung zur Seite 87 vom Skript

$$G(x, s) = \begin{cases} \frac{y_1(x) y_2(s)}{w(s)}, & x \leq s \\ \frac{y_1(s) y_2(x)}{w(s)}, & x \geq s \end{cases}$$

$$f(a^+) \equiv \lim_{x \rightarrow a^+} f(x)$$

$$\frac{\partial G}{\partial x}(s^+, s) = \lim_{\substack{x \rightarrow s^+ \\ x \geq s}} \frac{\partial G}{\partial x}(x, s) = \lim_{x \rightarrow s^+} \frac{y_1(s) y_2'(x)}{w(s)} = \frac{y_1(s) y_2'(s)}{w(s)}$$

$$\frac{\partial G}{\partial x}(s^-, s) = \lim_{\substack{x \rightarrow s^- \\ x \leq s}} \frac{\partial G}{\partial x}(x, s) = \lim_{x \rightarrow s^-} \frac{y_1'(x) y_2(s)}{w(s)} = \frac{y_1'(s) y_2(s)}{w(s)}$$

$$\frac{\partial G}{\partial x}(s^+, s) - \frac{\partial G}{\partial x}(s^-, s) = \frac{y_1(s) y_2'(s) - y_1'(s) y_2(s)}{w(s)} = \frac{w(s)}{w(s)} = 1.$$

$R_j: C^1([a, b]) \rightarrow \mathbb{R}$  lineare Abbildungen ( $[a, b] = [0, 1]$ )

$$R_1 y = y(0), \quad R_2 y = y(1).$$

$FS = (z_1, z_2); \quad z_1(x) = \cos x, \quad z_2(x) = \sin x$

$R_1 z_1 = z_1(0) = \cos 0 = 1, \quad R_1 z_2 = z_2(0) = \sin 0 = 0$

$R_2 z_1 = z_1(1) = \cos 1, \quad R_2 z_2 = z_2(1) = \sin 1.$

$$\begin{pmatrix} \cos 0 & \sin 0 \\ \cos 1 & \sin 1 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ \cos 1 & \sin 1 \end{pmatrix}, \quad \det A = 1 \cdot \sin 1 - 0 \cdot \cos 1 = \sin 1 \neq 0$$

RWP:  $y'' + y = 1; \quad y(0) = y(1) = 0.$

$$\begin{bmatrix} R_1 y = 0; & \gamma_1 = 0 \\ R_2 y = 0 & \gamma_2 = 0 \end{bmatrix}$$

$\checkmark R_1$

## Rechnungen zum Beispiel 160

$R_1 y =$

$$\underbrace{1 \cdot y(0)}_{\alpha_1} + \underbrace{0 \cdot y'(0)}_{\beta_1}$$

$R_2 y =$

$$\underbrace{1 \cdot y(1)}_{\alpha_2} + \underbrace{0 \cdot y'(1)}_{\beta_2}$$

$$\boxed{\det A(R_j z_k) \neq 0}$$

