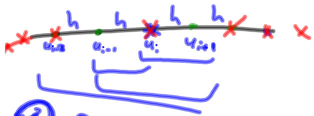
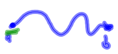


RWP : $F(x, y, y', \dots) = 0$

$x \in D$

$y(D) = A$



$y' = f(x, y)$

$y(a) = y_1$

$y(b) = y_2$

RWP $\longrightarrow$ AWP:

$$\left.\begin{array}{l} y'' = f(x, y, y') \\ y(a) = y_1 \\ y'(a) = s \end{array}\right\}$$ AWP irgendwie lösen (RK, Euler, Heun, ...) Auch analytisch!

$\Downarrow$

$y(x, s)$ ✓

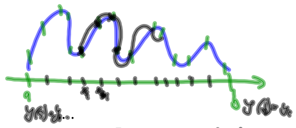
$y(x, s)$: $\underline{y(b, s)} = \underline{y_2}$

$\Downarrow$

s_*

$y(x) = y(x, s_*)$ löst RWP

Konstante



$y(a) = y_1 \dots$ $\quad$ $y(b) = y_2$

$a = x_0$: $[x_0, x_1]$: $y_1(x, s_1)$

$[x_1, x_2]$: $y_2(x, s_2)$: $y_2(x_1, s_2) = y_1(x_1, s_1)$

$s_1 = s_2$

wenn s y' approx.

1) Gl. lösen: "
2) AW mit "Phantomparameter" s_i auswerten
3) Zusammensetzung: $\rightsquigarrow$ (LGS

$\Downarrow$

Satz von Parametern s_i, die zusammen mit der Lösung der DGL die RWA lösen.

$y' = x^2 + y$;

$y' - y = x^2$

- Linear
- 1. Ord
- Konst. Koeff.
- inhomogen

$y = \underline{y_{hom}} + y_{part.}$

$y' - y = 0$

TdV: $\frac{dy}{dx} = y \iff \frac{dy}{y} = dx$

$x = \ln|y| + c_1$

$y_{hom} = ce^{x}, c \in \mathbb{R}$ $\overline{y = ce^{x}}$, $c \in \mathbb{R}$

$y_p = ax^2 + bx + c$

$y_p' = 2ax + b$

$y_p' - y_p = x^2 \implies 2ax + b - ax^2 - bx - c = x^2$

$\iff x^2(-1-a) + x(2a-b) + (b-c)x^0 = 0$

$\forall x$: Koeffizientenvergleich:

$$\begin{array}{l} x^2: \\ x: \\ x^0 = 1: \end{array} \left\{\begin{array}{lll} -1-a = 0 & \implies & a = -1 \\ 2a - b = 0 & \implies & b = 2 \\ b - c = 0 & \implies & c = -2 \end{array}\right.$$

$y_p = -x^2 + 2x - 2$

$\implies y = y_{hom} + y_p = Ce^{x} + x^2 + 2x - 2$, $C \in \mathbb{R}$

Mathematik 3