$\mathbb{Z}_3 : \{0, 1, 2\}$

$$(x^3 - x)(0) = 0$$
$$(x^3 - x)(1) = 0$$
$$(x^3 - x)(2) = 0$$

Polynom $x^3 - x$ zadává v $\mathbb{Z}_3$ stejnou funkci jako nulový polynom

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$$f(x_0) = 0 \overset{\text{def.}}{\iff} x_0 \text{ je kořenem } f$$

$f(x), g(x)$ ... polynomy

$f(x) = q(x) \cdot g(x) + r(x)$, kde $st(r(x)) < st(g(x))$ nebo $r(x) = 0$

$f(x_0) = 0$

$f(x) = (x - x_0) \cdot \underline{q(x)} + \cancel{r(x)}$ $\quad st(r(x)) = 0$ nebo $r(x) = 0$

$\underline{0 = f(x_0) = r(x_0)} \Rightarrow r$ <u>nulový polynom</u>

Předpokládejme (pro spor), že f a g jsou dva polynomy, které zadávají stejnou funkci $\mathbb{K} \to \mathbb{K}$ a přitom mají různé koeficienty.

$f-g: \ (a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0) -$

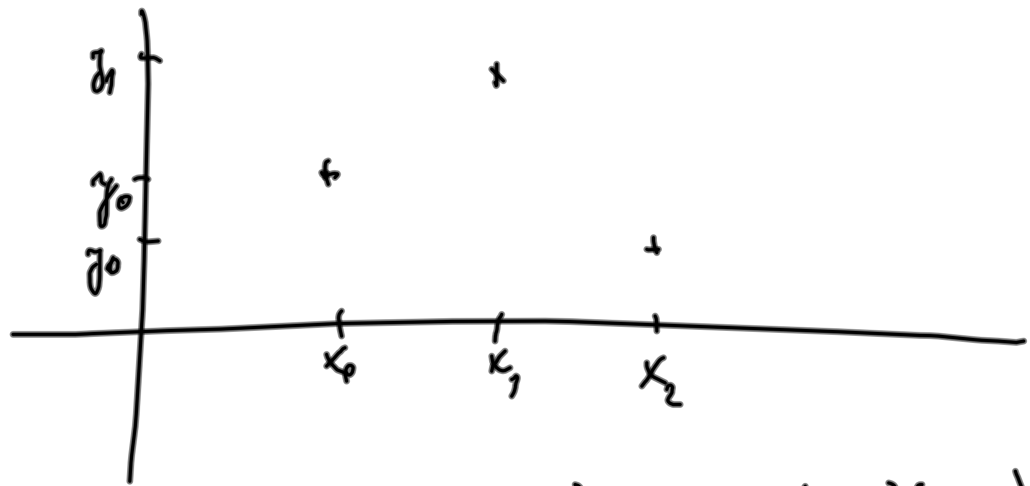
$- (b_n x^n + b_{n-1} x^{n-1} + \dots + b_1 x + b_0) =$

$c_2 x^2 + \dots + c_1 x + c_0$

$c_i = a_i - b_i$

je nenulový polynom, ale

$(f-g)(x) = f(x) - g(x) = 0$



$$l(x) = y_0 \cdot \frac{(x-x_1)(x-x_2)}{(x_0-x_1)(x_0-x_2)} + y_1 \cdot \frac{(x-x_0)(x-x_2)}{(x_1-x_0)(x_1-x_2)} +$$

$$+ y_2 \cdot \frac{(x-x_0)(x-x_1)}{(x_2-x_0)(x_2-x_1)}$$

$f(0)=1$, $f(1)=3$

$$1\cdot\frac{(x-1)}{0-1}+3\,\frac{(x-0)}{(1-0)}=-x+1+3x=2x+1$$

$f(0)=1$, $f(1)=3$, $f(2)=2$

$$1\cdot\frac{(x-1)(x-2)}{(0-1)(0-2)}+3\cdot\frac{(x-0)(x-2)}{(1-0)(1-2)}+2\cdot\frac{(x-0)(x-1)}{(2-0)(2-1)}=$$

$$=\frac{1}{2}(x^2-3x+2)-3\cdot(x^2-2x)+1(x^2-x)=$$

$$=-\frac{3}{2}x^2+\frac{7}{2}x+1$$

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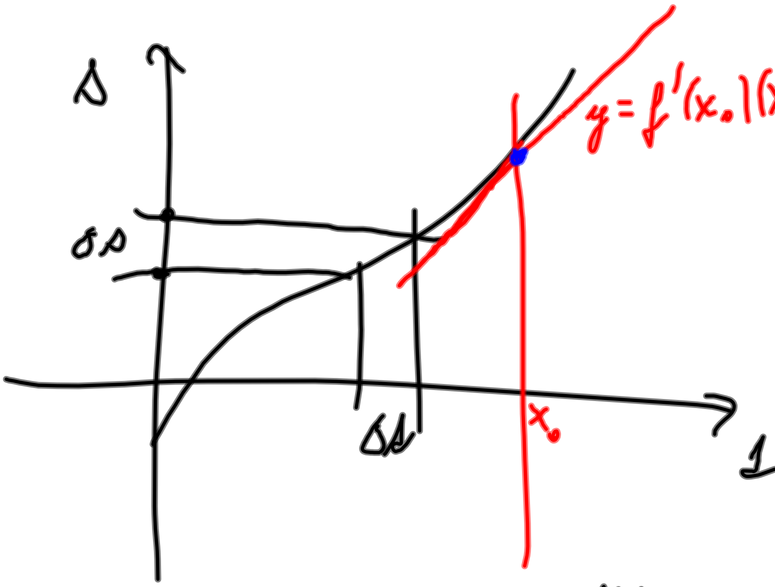

$$y = f'(x_0)(x - x_0) + f(x_0)$$

$$\frac{\Delta s}{\Delta t} \qquad \left(\frac{f(x+\Delta x) - f(x)}{\Delta x} \right.$$

$$f(x+\Delta x) = \underline{a_n}(x+\Delta x)^n + \underline{a_{n-1}}(x+\Delta x)^{n-1} + \dots + a_1(x+\Delta x) + a_0$$

$$f(x) = \underline{a_n x^n} + \underline{a_{n-1} x^{n-1}} \qquad + a_1 \cancel{x} + a_0$$

$f(x) = ax^3 + bx^2 + cx + d$

$f(0) = y_0 \Leftrightarrow d = y_0$

$f(1) = y_1 \Leftrightarrow a + b + c + d = y_1$

$f'(0) = y_0' \Leftrightarrow (3ax^2 + 2bx + c)(0) = y_0' \Leftrightarrow c = y_0'$

$f'(1) = y_1' \Leftrightarrow 3a + 2b + c = y_1'$

$$\begin{pmatrix} a \\ b \\ c \\ d \end{pmatrix} = A^{-1} \begin{pmatrix} y_0 \\ y_1 \\ y_0' \\ y_1' \end{pmatrix} \qquad A \cdot \begin{pmatrix} a \\ b \\ c \\ d \end{pmatrix} = \begin{pmatrix} y_0 \\ y_1 \\ y_0' \\ y_1' \end{pmatrix}$$

$\Rightarrow f(x) =$

$f(0) = 1 \quad (y_0)$

$f(1) = 3 \quad (y_1)$

$f'(0) = 2 \quad (y_0')$

$f'(1) = 2 \quad (y_1')$

$f(x) = 2x + 1$

$F = ma$

$a = \frac{d^2 s}{dt^2}$

$= s''(t)$