$$x_{k+2} - (\lambda_1+\lambda_2)x_{k+1} + \lambda_1\lambda_2 x_k = 0 \quad , k \in \mathbb{N}_0$$

$$\sum_{k=0}^{\infty} x_{k+2} z^{-k} = z^2 \sum_{j=2}^{\infty} x_j z^{-j} = z^2\left[X(z) - x_0 - x_1 z^{-1}\right] = z^2 X(z) - x_0 z^2 - x_1 z$$

$$\sum_{k=0}^{\infty} x_{k+1} z^{-k} = z \sum_{j=1}^{\infty} x_j z^{-j} = z\left[X(z) - x_0\right] = z X(z) - z x_0$$

$$\sum_{k=0}^{\infty} x_k z^{-k} = X(z)$$

Pro $|z| > \lambda_1, \lambda_2$ máme $\left[z^2 X(z) - x_0 z^2 - x_1 z\right] - (\lambda_1+\lambda_2)\left[z X(z) - x_0 z\right] + \lambda_1\lambda_2 X(z) = 0$

$$X(z)\left[z^2 - (\lambda_1+\lambda_2)z + \lambda_1\lambda_2\right] = x_0 z^2 + x_1 z - (\lambda_1+\lambda_2) z x_0$$

$$X(z) = \frac{x_0 z^2 + x_1 z - (\lambda_1+\lambda_2) z x_0}{(z-\lambda_1)(z-\lambda_2)} = \frac{x_0 + x_1/z + \frac{(\lambda_1+\lambda_2)x_0}{z}}{(1-\lambda_1/z)(1-\lambda_2/z)}$$

$s = z^{-1}$

$$X(s^{-1}) = \frac{x_0 + x_1 s - (\lambda_1+\lambda_2) x_0 s}{(1-\lambda_1 s)(1-\lambda_2 s)} = \frac{A}{1-\lambda_1 s} + \frac{B}{1-\lambda_2 s}$$

$$A(1-\lambda_2 s) + B(1-\lambda_1 s) = x_0 + x_1 s - (\lambda_1+\lambda_2) x_0 s$$

$s = 1/\lambda_1$: $A(1-\lambda_2/\lambda_1) = x_0 + x_1/\lambda_1 - \frac{\lambda_1+\lambda_2}{\lambda_1}\cdot x_0 = \frac{x_1}{\lambda_1} - \frac{\lambda_2}{\lambda_1} x_0 = \frac{1}{\lambda_1}(x_1 - \lambda_2 x_0)$

$s = 1/\lambda_2$: $B(1-\lambda_1/\lambda_2) = x_0 + x_1/\lambda_2 - \frac{\lambda_1+\lambda_2}{\lambda_2} x_0 = \frac{x_1}{\lambda_2} - \frac{\lambda_1}{\lambda_2} x_0 = \frac{1}{\lambda_2}(x_1 - \lambda_1 x_0)$

$$A = \frac{x_1 - \lambda_2 x_0}{\lambda_1 - \lambda_2} \; ; \; B = \frac{x_1 - \lambda_1 x_0}{\lambda_2 - \lambda_1} \quad (*)$$

Pak $X(s^{-1}) = A \sum_{k=0}^{\infty} (\lambda_1 s)^k + B \sum_{k=0}^{\infty} (\lambda_2 s)^k = \sum_{k=0}^{\infty} x_k s^k$

$\boxed{x_k = A\lambda_1^k + B\lambda_2^k}$, kde A, B jsou dány vzorcem $(*)$ tj. $\boxed{A+B = x_0}$ ($k=$ a dále

$$\boxed{A\lambda_1 + B\lambda_2} = \frac{x_1 - \lambda_2 x_0}{\lambda_1 - \lambda_2}\lambda_1 - \frac{x_1 - \lambda_1 x_0}{\lambda_1 - \lambda_2}\lambda_2 = \frac{x_1\lambda_1 - \cancel{\lambda_2\lambda_1 x_0} - x_1\lambda_2 + \cancel{\lambda_1\lambda_2 x_0}}{\lambda_1 - \lambda_2} = \boxed{x_1}$$

POSTUP VE SPECIÁLNÍM PŘÍPADĚ

PŘES VYTVOŘUJÍCÍ FUNKCE

RESP. Z-TRANSFORMACI