2. $y'' + 9y = 0$ $\quad y(5) + 14\,y'(5) = 10$ $\quad K = 9$

$y(1) = 0$ $\quad I = 14$

$$y = \sum_{n=0}^{\infty} a_n x^n \qquad y' = \sum_{n=1}^{\infty} n a_n x^{n-1} \qquad y'' = \sum_{n=2}^{\infty} n(n-1) a_n x^{n-2}$$

$$\sum_{n=2}^{\infty} n(n-1) a_n x^{n-2} + 9 \sum_{n=0}^{\infty} a_n x^n = 0$$

$p = n-2$ $\quad p = n$

$n = p+2$ $\quad n = p$

$$\sum_{p=0}^{\infty} (p+2)(p+1) a_{p+2} x^p + 9 \sum_{p=0}^{\infty} a_p x^p = 0$$

$$\sum_{p=0}^{\infty} \left[(p+2)(p+1) a_{p+2} + 9 a_p \right] x^p = 0 \quad \Longrightarrow \quad p = 0, 1, 2, 3 \ldots$$

$$a_{p+2} = \frac{-9 a_p}{(p+2)(p+1)}$$ recurrence

code

(idx = p+2

p = idx − 2)

$a_2 = \frac{-9a_0}{2} = 0$ $\quad p = 0$

$a_3 = \frac{-9a_1}{6} = \frac{-9a_1}{6}$ $\quad p = 1$

$a_4 = \frac{-9a_2}{12} = 0$ $\quad p = 2$

$a_5 = \frac{-9a_3}{20}$ $\quad p = 3$

$a_6 = 0$ $\quad p = 4$

$a_7 = \frac{-9a_5}{42}$ $\quad p = 5$