$\boxed{Z5}$

$$f(\alpha) = f'(\alpha) = 0 \neq f''(\alpha)$$

$$x_{n+1} = F(x_n) = x_n - \frac{f(x_n)}{f'(x_n)}$$

$$F(\alpha) = \alpha - \frac{0}{f'(x_n)} = \alpha$$

$$F'(x_n) = 1 - \frac{f'(x_n)^2 - f''(x_n) f(x_n)}{f'(x_n)^2}$$

$$\lim_{x \to \alpha} \frac{f'(x)^2 - f''(x) \cdot f(x)}{f'(x)^2} \overset{dH}{=} 1 - \lim_{x \to \alpha} \left(\frac{f'''(x) \cdot f(x) + f'(x) f'(x)}{2 f'(x) \cdot f''(x)} \right) \overset{dH}{=}$$

$$= 1 - \lim_{x \to \alpha} \left(\frac{\underset{\nearrow 0}{f^{(4)}(x) \cdot f(x)} + \underset{\nearrow 0}{2 f'(x) f'''(x)} + \underset{\nearrow 0}{f''(x)^2}}{\underset{\searrow 0}{2 f''(x)^2} + \underset{\searrow 0}{2 f'(x) f'''(x)}} \right) = \frac{1}{2}$$

$$F'(\alpha) = 1 - \frac{1}{2} = \frac{1}{2}$$

Sprawdzam wartość stałej asymptotycznej dla p = 1:

$$C = \frac{F'(\alpha)}{1!} = \frac{1}{2} \Rightarrow 0 < C < 1$$

z zad. L5.3

Korzystając z zadania L5.3 dostajemy, że metoda Newtona jest zbieżna liniowo

Created with IDroo.com