

Rozkład na ułamki proste

1) Pierwiastki pojedyncze

$$F(s) = \frac{L(s)}{M(s)} = \frac{L(s)}{(s-p_1)(s-p_2)\dots(s-p_n)} = \frac{A_1}{s-p_1} + \frac{A_2}{s-p_2} + \dots + \frac{A_m}{s-p_n}$$

$$A_1 = [(s-p_1) \cdot F(s)]|_{s=p_1}$$

$$A_2 = [(s-p_2) \cdot F(s)]|_{s=p_2}$$

⋮

$$A_m = [(s-p_n) \cdot F(s)]|_{s=p_n}$$

2) Pierwiastki wielokrotne

$$F(s) = \frac{L(s)}{M(s)} = \frac{L(s)}{(s-p_n)^m} = \frac{A_{11}}{(s-p_n)^m} + \frac{A_{12}}{(s-p_n)^{m-1}} + \frac{A_{13}}{(s-p_n)^{m-2}} + \dots + \frac{A_{1m}}{s-p_n}$$

$$A_{11} = [(s-p_n)^m \cdot F(s)]|_{s=p_n}$$

$$A_{12} = \frac{d}{ds} [(s-p_n)^m \cdot F(s)]|_{s=p_n}$$

$$A_{13} = \frac{1}{2} \frac{d^2}{ds^2} [(s-p_n)^m \cdot F(s)]|_{s=p_n}$$

⋮

$$A_{1m} = \frac{1}{(m-1)!} \frac{d^{(m-1)}}{ds^{(m-1)}} [(s-p_n)^m \cdot F(s)]|_{s=p_n}$$