

Task 1 (30 extra points)

Given two polynomials $p = p(z)$ and $q = q(z)$, with $\deg(p) \geq \deg(q) + 2$, show that the sum of the residues at all poles of the rational function

$$f(z) = \frac{p(z)}{q(z)} \tag{1}$$

is zero, i.e.,

$$\sum_{i=1}^{\deg(q)} \operatorname{Res}_{z=z_i} f(z) = 0. \tag{2}$$

The tasks are due Thursday, 26-SEP-2024.