

Assignment on Horner's Rule

Consider two polynomials $a(x) = \sum_{k=0}^n \alpha_k x^{n-k}$ with $\alpha_k \in \mathbb{R}$, $k = 0 : n$ and $b(x) = \sum_{k=0}^m \beta_k x^{m-k}$ with $\beta_k \in \mathbb{C}$, $k = 0 : m$. Write efficient Matlab code that uses your Horner's rule to compute $a^{(2)} \circ b^{(1)}(x)$, with $x \in \mathbb{C}$. The latter notation is **function composition**, that is, the 2nd derivative of a at the 1st derivative of b at x or $a^{(2)}[b^{(1)}(x)]$.

Test your code on a , b and x given in the provided Matlab data file **InpHorner_ab**.

Recall that an algorithm is efficient when it is fast, it is not wasteful of storage, and does not produce unnecessarily inaccurate results. For the given data the answer is $a^{(2)} \circ b^{(1)}(x) = -(46.039 + 2.4881i) \times 10^2$ rounded to five significant digits.

Your hand out should include a brief theoretical discussion of how you proceed, along with your code and its results. Your matlab code should be submitted electronically along with clear instructions on how to run it.

While testing your code you may find useful the build-in matlab function *polyval*.