

1

Which of the following two ways to compute a polynomial is stable? Which one is the more efficient algorithm?

1. $p(x) = a_0 + a_1x + \cdots + a_nx^n, x \in \mathbb{R}$
2. $p(x) = a_0 + x(a_1 + x(a_2 + x(a_3 + \cdots + x(a_{n-1} + xa_n) \dots)))$

Solution:

2

Compute the condition number for the following two matrices.

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix} \qquad B = \begin{bmatrix} 168 & 113 \\ 113 & 76 \end{bmatrix}$$

Solution:

3

Please write matrix (1) (slide 3 in BST_234_Numerical_Aspects_of_Algorithms March 4) in:

1. triplet format
2. csr format

4

Given 2 sparse $(n \times n)$ -times matrices, A and B. What is the expected sparsity of $A + B$ and $A \times B$

5

For genotype matrices, define a new csr format that takes the special data structure of genotype data into account.

- Using simulation studies (by drawing from the provided MAF data), how much storage space do you save on average?
- At least how much storage space do you save in 95% of the cases/simulation studies?