CS/SE 4X03 Scientific Computation

Midterm Exam 29 October 2021

11:30-12:30

Instructions:

- 1. You must not communicate with anybody during this exam.
- 2. You must not use the Internet.
- 3. You can use a calculator
- 4. You must not use Matlab.
- 5. Textbooks <u>are allowed</u>.
- 6. Write in the provided space. You can write on separate pages if you wish.
- 7. Submit one PDF. Name your file Lastname-Firstname-studentnumber.pdf.
- 8. Submit your PDF file to Avenue by 12:45p.m.
- 9. If you have a SAS accommodation, please email me your PDF within the time allowed.
- 10. Sign the next page electronically and you must submit it with your exam.

NO PDFs WILL BE ACCEPTED IF SENT BY EMAIL

McMaster University Statement on Academic Integrity:

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty") and/or suspension of expulsion from the university.

"By signing this document I agree to follow the McMaster University Policy on Academic Integrity. My signature below confirms that the work submitted for this exam is my own and did not involve the use of unauthorized aids."

STUDENT NAME: Mingzhe Wang

STUDENT ID: 400316660

STUDENT SIGNATURE: Mingzhe Wang

P1. (a) $x = 1 \times 10^{178}$ y = 0

when whit x x y, when x x y.

when $x \approx y$, both expression will have cancellation error but the callcellation error in (x^2-y^3) has a more larger magnitude, while which will contarge this error, $\chi(x-y)$ will which will contarge this error because we loss less has a smaller error because we loss less that digits.

P\$. assume
$$A_{5\times5}$$
 B_{t+1} . where set:
$$T(F_{x}=b) = O(n^{3})$$

$$T(A_{x}=b_{1}) = O(S^{3})$$

$$T(L_{32} = L_3 - B_{31}) = \cdot 0 (t^3)$$
.

$$\frac{t_A \#}{t_B} = \frac{O(n^3)}{O(s^3) + O(t^3)} = \frac{O(n^3)}{max \left(O(s) \#, O(t^3)\right)}$$

P5.

P6.

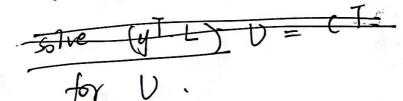
(9)

=

use route for solving a triengle system.

solve

to get p.



tel Solve

where $E \neq \leq H$ = fruch
/2 #x44) = fl(fl(x2)+ fl(y)) = . (flex) + fley)) (H 5,) = (x2(1+ Ez) + y(1+ E3)) (/+ E1) x2 (|+ E1) 8 |+ E2) + 4(|+ E1) (|+ E3). x2 (|+ fi+ fs+ fifz) + 42 |+ 6,62) fier << u x2 (1+ E1+ E2)+ 4(1+ E1+ E3) - (1+ (1) (x+ y) + (2x+ (3))

Ne note bi= 6,162 denn 68= 61+t2 x2+62) + y(+ 613)

6 5 Zu