Home Work (1) - Tools For numerical analysis

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1 Submission

You must submit your Homework until the 15.4.2020, 23:59 pm [Israel time]. Include your full name and ID number (in the email title and body). A work without full name and ID number won't be excepted. You must submit your home work with all the questions answered. The submission is done by email. Please submit your work as a single PDF file (with the texts, graphs, and calculation plots) and all the code files. In case of reserve or illness, please send me an email in advance.

2 Home Work

- (1) Assuming $\pi = 3.14159$ and you computer can store 5 digits after the decimal point. Does $100\pi = \pi + ._{100} + \pi$? Show your answer using code and explain why this is happening.
- (2) Convert the following numbers to binary and hexadecimal presentations: 7, 15, 32, 141, 55
- (3) Convert the following numbers to decimal presentation: 111111, 010111, 011011, 000101, 011011
- (4) Find the Taylor series for the function $f(x) = cos(x) - sin(x)$ up to the second order ($n = 2$). We wish to approximate the value of the function at $x = \frac{\pi}{3}$ where the function bonded between 0 and 5 ($[0, 5]$). Find the value in the point and bound the error in the approximation.
- (5) Assuming $\pi = 3.14, R^* = 9.99, \Delta R = 0.02$. What is the absolute and relative error of the following function $S(R, \pi) = \pi \cdot R^2$?
- (6) Where $|x| < 0.01$, explain the problem of calculating the following function $f(x) = \frac{sin(x)}{1-\sqrt{1+x}}$. How can you handle this problem?