In the name of God

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ADVANCED METHODS ON COMPUTATIONAL PHYSICS

Exercise Set 6

(Date Due: 1400/02/31)

1. Discretization: Use the "*dataprofile.txt*" and compute the derivative of signal with 3-point, 5-point, 7-point and 9-point neighbors in central difference formula (CDF). Compare your results. **Hint:** in the class I taught 3-point and 5-point central difference formula.

2. Implicit and Explicit methods for solving differential equation:
A: Suppose that $f' \equiv \frac{df(x)}{dx} = f^2(x)$ and step size $\Delta x = 0.5$ and $f(x = 1) = 1$. Use explicit and implicit approaches to compute $f(x)$. Compare your results.
B: Suppose that $f' \equiv \frac{df(x)}{dx} = -f(x)$ and step size $\Delta x = 0.5$ and $f(x = 1) = 1$. Use explicit and implicit approaches to compute $f(x)$. Compare your results.

Good luck, Movahed