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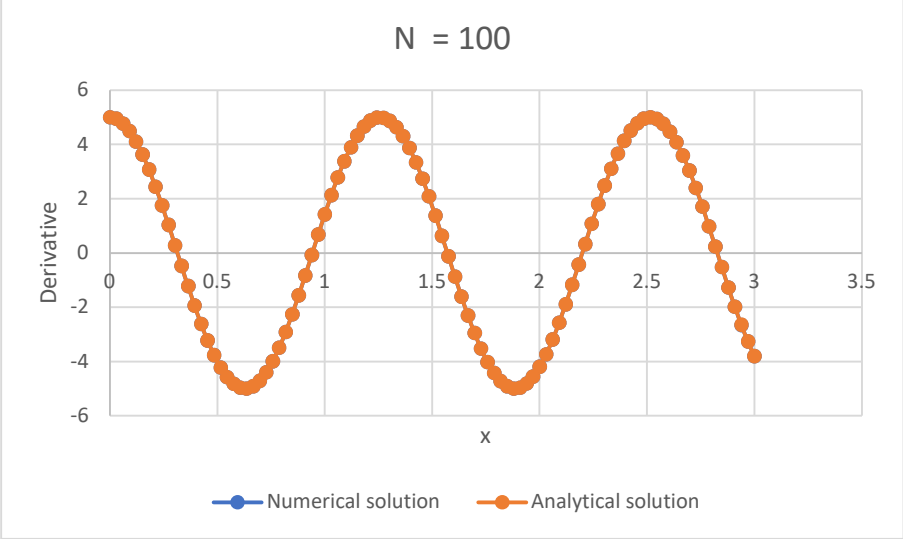
ID5130 - Parallel Scientific Computing
Assignment - 2

1.

Status of code: runs-and-gives-correct-result

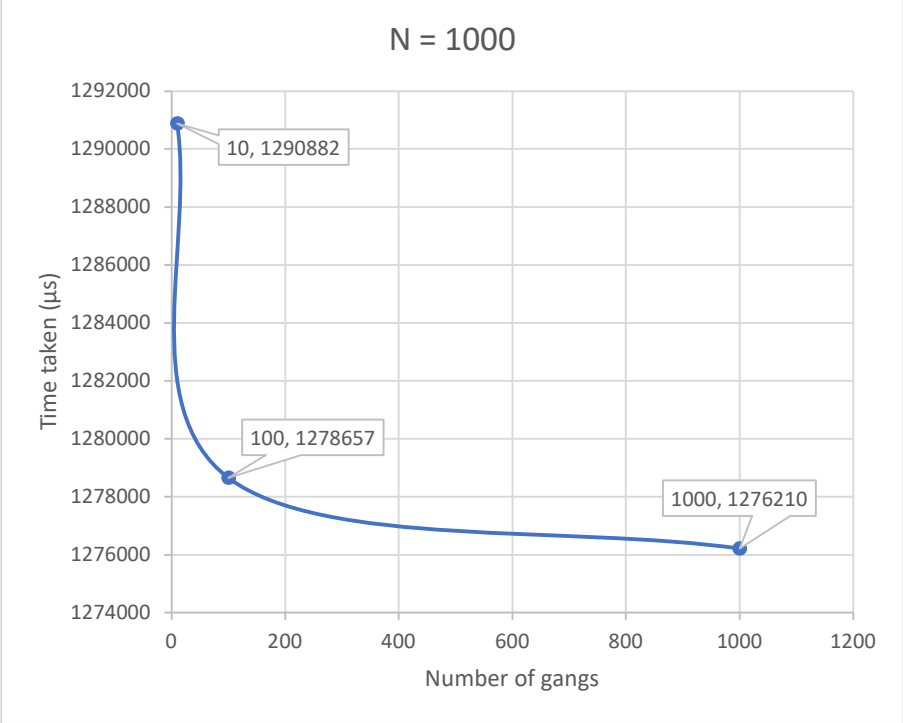
The following plot represents obtained the numerical and analytical solution as a function of x using LU decomposition for dense matrix (the sparse matrix method will not have enough parallelism) for N = 100 and number of gangs = 10.

Both the numerical and analytical solution plots are overlapping one another. Therefore, the result of LU decomposition is correct.



The following table shows the time taken (micro-seconds) by the full parallel solver for number of gangs = 10, 100, 1000 for N = 1000.

Function()		*10*	*100*	*1000*
init_A()	-	*723*	*649*	*648*
init_b()	-	*18*	*18*	*19*
LU_Decompose()	*LU Decomposition*	*1,287,945*	*1,275,398*	*1,273,345*
	Forward Substitution	*959*	*1,181*	*958*
	Backward Substitution	*1,199*	*1,373*	*1,198*
main()	-	*38*	*38*	*42*
Total Time		*1,290,882*	*1,278,657*	*1,276,210*



2.

Status of code: runs-and-gives-correct-result

The following table shows the time taken (micro-seconds) by the serial and the parallel codes using Cholesky decomposition for N = 10, 100, 1000. The optimum number of gangs used was = 100.

	Serial	*Parallel*
N = 10	*671.000*	*90*
N = 100	*973.028*	*147*
N = 1000	*172,980.334*	*2,418*