

Report - Lab 9

1. To analyze Runge-Kutta method of order 2 and 4:

h	Error Order 2	Alpha Order 2	Error Order 4	Alpha Order 4
0.2	0.847608182	1.566793316	0.0972093962	3.983244295
0.1	0.2861167974	1.838941057	0.0061465615	4.002596716
0.05	0.0799773365	1.930009483	0.0003834693	4.004102295
0.025	0.0209882482	1.967349929	0.0000238988	4.002758478
0.0125	0.0053671638	1.984230265	0.0000014908	4.001480927
0.00625	0.0013565382	1.992250324	0.0000000931	3.998665403
0.003125	0.0003409612		0.0000000058	

Since h is decreasing by the factor of 2,

In order 2 method, Error is decreasing by the factor of 4.

In order 4 method, Error is decreasing by the factor of 16.

Hence rate of convergence is also calculated which is consistent with the theory.