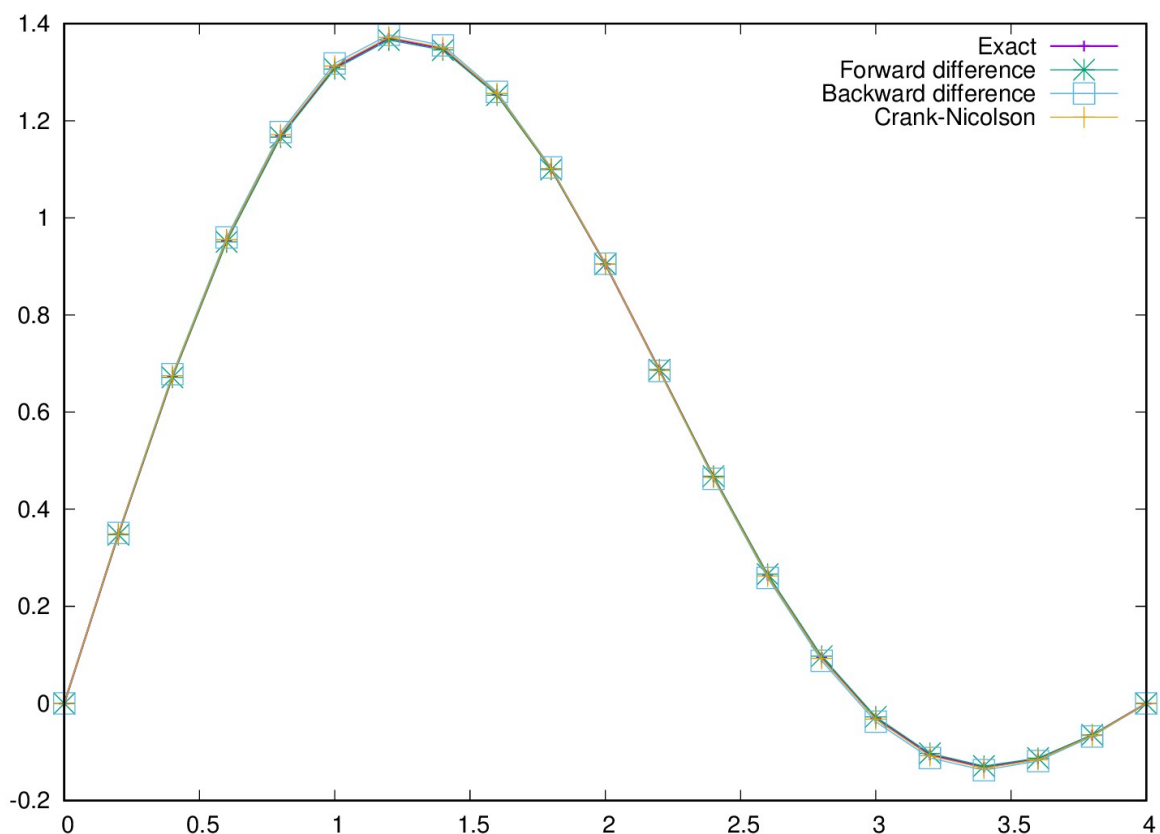-Deerghanshu, 160122011.

1. Relative comparison of different methods:

x(t=0.4)	Exact	Forward	Error	Backward	Error	Crank-Nicolson	Error
0	0	0	0	0	0	0	0
0.2	0.348688	0.347653	0.001035	0.351067	0.002379	0.349387	0.000699
0.4	0.673614	0.671643	0.001971	0.678147	0.004533	0.674945	0.001331
0.6	0.953088	0.950367	0.002721	0.959344	0.006256	0.954925	0.001837
0.8	1.16936	1.16615	0.00321	1.17675	0.00739	1.17153	0.00217
1	1.31014	1.30673	0.00341	1.31796	0.00782	1.31243	0.00229
1.2	1.36954	1.36627	0.00327	1.37707	0.00753	1.37175	0.00221
1.4	1.34852	1.34568	0.00284	1.35505	0.00653	1.35044	0.00192
1.6	1.25456	1.25241	0.00215	1.25949	0.00493	1.25601	0.00145
1.8	1.10084	1.09958	0.00126	1.10374	0.0029	1.10169	0.00085
2	0.904837	0.90457	0.000267	0.905471	0.000634	0.905023	0.000186
2.2	0.686557	0.687286	0.000729	0.684903	0.001654	0.686071	0.000486
2.4	0.466547	0.468181	0.001634	0.462813	0.003734	0.46545	0.001097
2.6	0.263916	0.266277	0.002361	0.258511	0.005405	0.262328	0.001588
2.8	0.0945167	0.0973558	0.0028391	0.0880125	0.0065042	0.0926058	0.0019109
3	-0.0305034	-0.0274796	0.0030238	-0.0374332	0.0069298	-0.0325391	0.0020357
3.2	-0.105662	-0.102764	0.002898	-0.112306	0.006644	-0.107614	0.001952
3.4	-0.131513	-0.129035	0.002478	-0.137194	0.005681	-0.133182	0.001669
3.6	-0.114394	-0.112588	0.001806	-0.118535	0.004141	-0.11561	0.001216
3.8	-0.0655925	-0.0646415	0.000951	-0.0677733	0.0021808	-0.0662331	0.0006406
4	0.00E+00	0	0	0	0	0	0

2. Graphical Comparison

3. After dt = 0.2, the forward difference method loses its stability,