第一題

Euler Method (h = 0.1)

t	Euler	Exact	Error (Euler)
1.000000	0.000000	0.000000	0.000000
1.100000	0.100000	0.105160	0.005160
1.200000	0.209917	0.221243	0.011325
1.300000	0.330471	0.349121	0.018651
1.400000	0.462354	0.489682	0.027328
1.500000	0.606285	0.643875	0.037590
1.600000	0.763041	0.812753	0.049711
1.700000	0.933475	0.997494	0.064019
1.800000	1.118537	1.199439	0.080902
1.900000	1.319293	1.420116	0.100823
2.000000	1.536943	1.661282	0.124338

Taylor 2nd Order Method (h = 0.1)

t	Taylor 2nd	Exact	Error (Taylor 2nd)
1.000000	0.000000	0.000000	0.000000
1.100000	0.105000	0.105160	0.000160
1.200000	0.220919	0.221243	0.000324
1.300000	0.348612	0.349121	0.000509
1.400000	0.488954	0.489682	0.000728
1.500000	0.642883	0.643875	0.000993
1.600000	0.811438	0.812753	0.001315
1.700000	0.995787	0.997494	0.001707
1.800000	1.197252	1.199439	0.002187

1.900000	1.417344	1.420116	0.002772
2.000000	1.657795	1.661282	0.003487

第二題

RK4 Results (h = 0.1)

t	u1_RK4	u1_exact	err_u1	u2_RK4	u2_exact	err_u2
0.00000000	1.33333333	1.33333333	0.00000000	0.66666667	0.66666667	0.00000000
0.10000000	-3.05243707	1.79306259	4.84549965	8.98930534	-1.03200245	10.02130780
0.20000000	-23.84779486	1.42390240	25.27169730	51.19270400	-0.87468103	52.06738500
0.30000000	-130.16520171	1.13157652	131.296778000	269.269193117	-0.72499857	269.994192000
0.40000000	-680.23148509	0.90940859	681.140894000	1399.36858350	-0.60821421	1399.97680000
0.50000000	-3531.29958537	0.73878784	3532.03837000	7258.24183884	-0.51565767	7258.75750000
0.60000000	-18312.79505221	0.60570965	18313.40080000	37634.95548298	-0.44041076	37635.39590000
0.70000000	-94951.33190728	0.49986025	94951.83180000	195131.87173536	-0.37740382	195132.24900000
0.80000000	-492306.46567148	0.41367148	492306.879000000	1011721.87207795	-0.3229	1011722.20000000

	3948				5352	
0.90000000	-2552513.62386741	0.34161435	2552513.97000000	5245578.82658988	-0.27440884	5245579.10000000
1.00000000	-13234278.78916787	0.27967491	13234279.10000000	27197287.20658695	-0.22988784	27197287.40000000

RK4 Results (h = 0.05)

t	u1_RK4	u1_exact	err_u1	u2_RK4	u2_exact	err_u2
0.00000000	1.33333333	1.33333333	0.00000000	0.66666667	0.66666667	0.00000000
0.05000000	1.72188026	1.91205863	0.19017838	-0.49959934	-0.90907659	0.40947724
0.10000000	1.72691505	1.79306259	0.06614754	-0.83259771	-1.03200245	0.19940475
0.15000000	1.61716063	1.60196676	0.01519387	-0.89037299	-0.96145871	0.07108572
0.20000000	1.48168729	1.42390240	0.05778489	-0.86104209	-0.87468103	0.01363894
0.25000000	1.34894503	1.26764562	0.08129941	-0.80750453	-0.79522077	0.01228376
0.30000000	1.22706330	1.13157652	0.09548678	-0.75034063	-0.72499857	0.02534206
0.35000000	1.11747812	1.01299856	0.10447957	-0.69588591	-0.66305963	0.03282629
0.4000000	1.0195254	0.9094085	0.1101168	-0.6457317	-0.6082142	0.0375175

0	6	9	7	6	1	5
0.4500000	0.9319766	0.8186295	0.1133471	-0.5999342	-0.5593892	0.0405449
0.5000000	0.8535405	0.7387878	0.1147526	-0.5580924	-0.5156576	0.0424348
0.5500000	0.7830172	0.6682746	0.1147426	-0.5197062	-0.4762247	0.0434815
0.6000000	0.7193370	0.6057096	0.1136273	-0.4842903	-0.4404107	0.0438795
0.6500000	0.6615602	0.5499094	0.1116508	-0.4514070	-0.4076353	0.0437717
0.7000000	0.6088676	0.4998602	0.1090074	-0.4206726	-0.3774038	0.0432688
0.7500000	0.5605468	0.4546947	0.1058521	-0.3917540	-0.3492955	0.0424585
0.8000000	0.5159800	0.4136714	0.1023085	-0.3643646	-0.3229535	0.0414111
0.8500000	0.4746325	0.3761577	0.0984748	-0.3382585	-0.2980760	0.0401825
0.9000000	0.4360426	0.3416143	0.0944282	-0.3132261	-0.2744088	0.0388172
0.9500000	0.3998123	0.3095830	0.0902293	-0.2890892	-0.2517386	0.0373505
1.0000000	0.3655998	0.2796749	0.0859249	-	-	0.0358101

0	3	1	2	0.2656979 9	0.2298878 4	5