

Numerical Solutions of $y' = 1 - t + 4y$, $y(0) = 1$

t_n	exact	Euler			Improved Euler	
		with $h = .1$ error	with $h = .01$ error	with $h = .001$ error	with $h = .1$ error	with $h = .01$ error
.1	1.609041828	1.50 .11	1.595 .14 $\times 10^{-1}$	1.6076 .14 $\times 10^{-2}$	1.595 .14	1.60886 .18 $\times 10^{-3}$
.2	2.505329853	2.19 .31	2.464 .41 $\times 10^{-1}$	2.5011 .42 $\times 10^{-2}$	2.464 .41 $\times 10^{-1}$	2.50478 .55 $\times 10^{-3}$
.3	3.830138846	3.15 .68	3.739 .91 $\times 10^{-1}$	3.8207 .94 $\times 10^{-2}$	3.737 .93 $\times 10^{-1}$	3.82891 .12 $\times 10^{-2}$
.4	5.794226004	4.47 1.3	5.614 .18	5.7755 .19 $\times 10^{-1}$	5.610 .18	5.79179 .24 $\times 10^{-2}$
.5	8.712004117	6.32 2.4	8.377 .34	8.6771 .35 $\times 10^{-1}$	8.370 .34	8.70746 .45 $\times 10^{-2}$
.6	13.05252195	8.90 4.2	12.45 .60	12.990 .63 $\times 10^{-1}$	12.44 .61	13.04439 .81 $\times 10^{-2}$
.7	19.51551804	12.5 7.0	18.48 1.0	19.407 .11	18.46 1.1	19.5014 .14 $\times 10^{-1}$
.8	29.14487961	17.5 12	27.38 1.8	28.960 .18	27.35 1.8	29.1208 .24 $\times 10^{-1}$
.9	43.4979034	24.6 19	40.55 2.9	43.187 .31	40.49 3.0	43.4574 .41 $\times 10^{-1}$
1.0	64.89780316	34.4 30	60.04 4.9	64.383 .51	59.94 5.0	64.8307 .67 $\times 10^{-1}$
final percentage error		47%	7.5%	.78%	7.6%	.10%
# evaluations of $f(t, y)$		10	100	1000	20	200

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t_n	exact	Runge Kutta		Extrapolated Euler		Extrap with $h =$ erro
		with $h = .1$ error	with $h = .01$ error	with $h = .2, .1$ error	with $h = .02, .01$ error	
.1	1.609041828	1.60893 $.11 \times 10^{-3}$	1.609041814 $.14 \times 10^{-7}$		1.60825 $.79 \times 10^{-3}$	
.2	2.505329853	2.50501 $.32 \times 10^{-3}$	2.50532981 $.43 \times 10^{-7}$	2.38 .13	2.5027 $.26 \times 10^{-2}$	2.491 $.14 \times 10^{-1}$
.3	3.830138846	3.82941 $.73 \times 10^{-3}$	3.83013875 $.96 \times 10^{-7}$		3.8236 $.65 \times 10^{-2}$	
.4	5.794226004	5.79279 $.14 \times 10^{-2}$	5.79422581 $.19 \times 10^{-6}$	5.19 .61	5.780 $.14 \times 10^{-1}$	5.73 $.64 \times 10^{-1}$
.5	8.712004117	8.70932 $.27 \times 10^{-2}$	8.71200376 $.36 \times 10^{-6}$		8.68 $.29 \times 10^{-1}$	
.6	13.05252195	13.0477 $.48 \times 10^{-2}$	13.0525213 $.65 \times 10^{-6}$	10.9 2.2	12.997 $.56 \times 10^{-1}$	12.8 .22
.7	19.51551804	19.5071 $.84 \times 10^{-2}$	19.5155169 $.11 \times 10^{-5}$		19.41 .10	
.8	29.14487961	29.1306 $.14 \times 10^{-1}$	29.1448777 $.19 \times 10^{-5}$	22.6 6.5	28.96 .18	28.4 .68
.9	43.4979034	43.4740 $.24 \times 10^{-1}$	43.4979002 $.32 \times 10^{-6}$		43.17 .33	
1.0	64.89780316	64.8581 $.40 \times 10^{-1}$	64.8977978 $.53 \times 10^{-5}$	46 18	64.32 .58	62.9 2.0
final percentage error		.061%	.0000083%	28%	.89%	3%
# evaluations of $f(t, y)$		40	400	15	150	30