

Euler's Method

IVP:

$$\frac{dy}{dt} = (1 + 4t)\sqrt{y}, \quad 0 < t < 1.$$

$$y(0) = 1.$$

Table 1: Results for 4 segments, $h = 0.25$.

Computation #	y_{true}	y_{Euler}	t	Global Error (%)	Local Error (%)
0	1.0000000000	1.0000000000	0.000000		
1	1.4101562500	1.2500000000	0.250000	11.4	11.4
2	2.2500000000	1.8090169944	0.500000	19.6	10.9
3	3.7539062500	2.8177647623	0.750000	24.9	10.1
4	6.2500000000	4.4963846604	1.000000	28.1	8.9

Table 2: Results for 8 segments, $h = 0.125$.

Computation #	y_{true}	y_{Euler}	t	Global Error (%)	Local Error (%)
0	1.0000000000	1.0000000000	0.000000		
1	1.1623535156	1.1250000000	0.125000	3.2	3.2
2	1.4101562500	1.3238737822	0.250000	6.1	3.2
3	1.7639160156	1.6115230676	0.375000	8.6	3.2
4	2.2500000000	2.0082286254	0.500000	10.7	3.2
5	2.9006347656	2.5396485633	0.625000	12.4	3.0
6	3.7539062500	3.2368605883	0.750000	13.8	2.9
7	4.8537597656	4.1364244533	0.875000	14.8	2.7
8	6.2500000000	5.2804482947	1.000000	15.5	2.5

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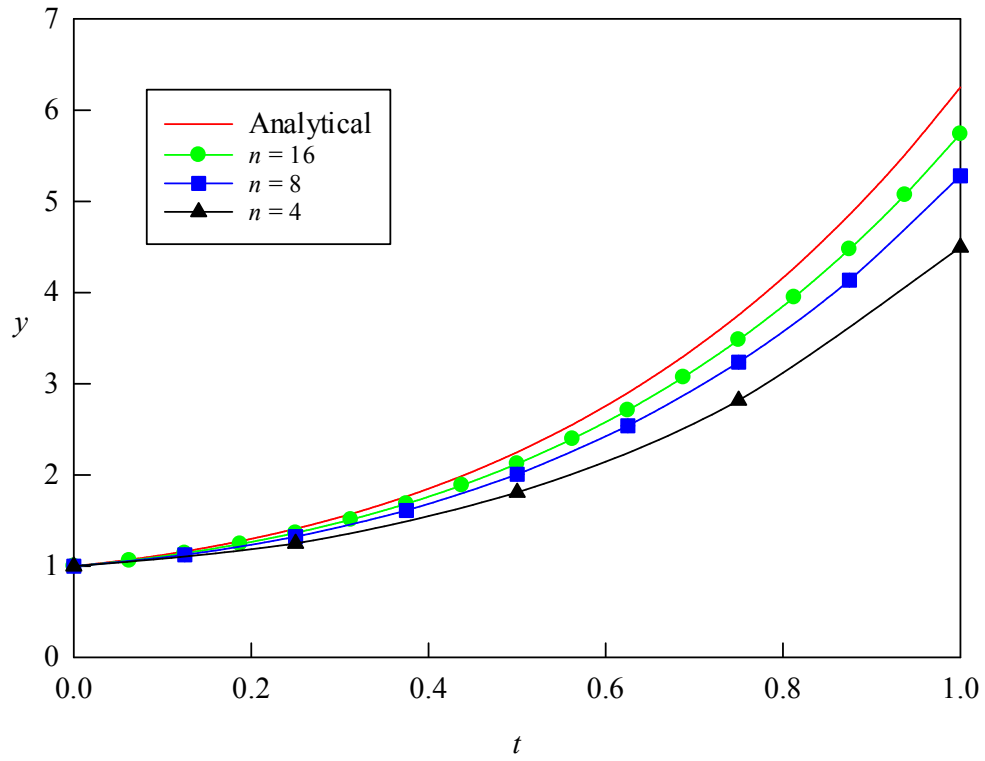


Fig. 1: Variations for various segment numbers and the analytical solution.