TP

> $with(Student[NumericalAnalysis])$:

> $DE1 := \frac{d}{dt} y(t) = y(t) - t^2 + 1$:

> $InitialValueProblem(DE1, y(0) = 0.5, t = 3)$

$$5.066$$

> $InitialValueProblem(DE1, y(0) = 0.5, t = 3, output = Error)$

$$0.8916$$

> $DE2 := \frac{d}{dt} y(t) = 1 - \cos(t)$:

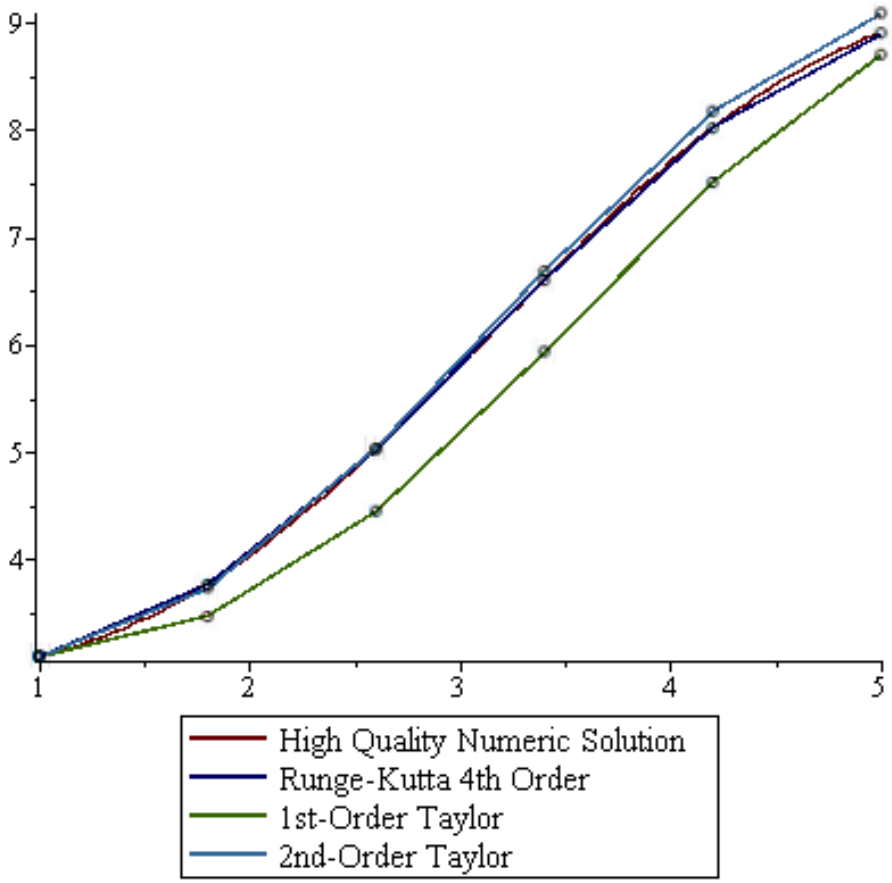
> $DE3 := \frac{d}{dt} y(t) = y(t) - t^2 + \frac{t^3}{9}$:

the order of the Taylor polynomial used by a Taylor method in the comparewith option can be specified as the second item in the list:

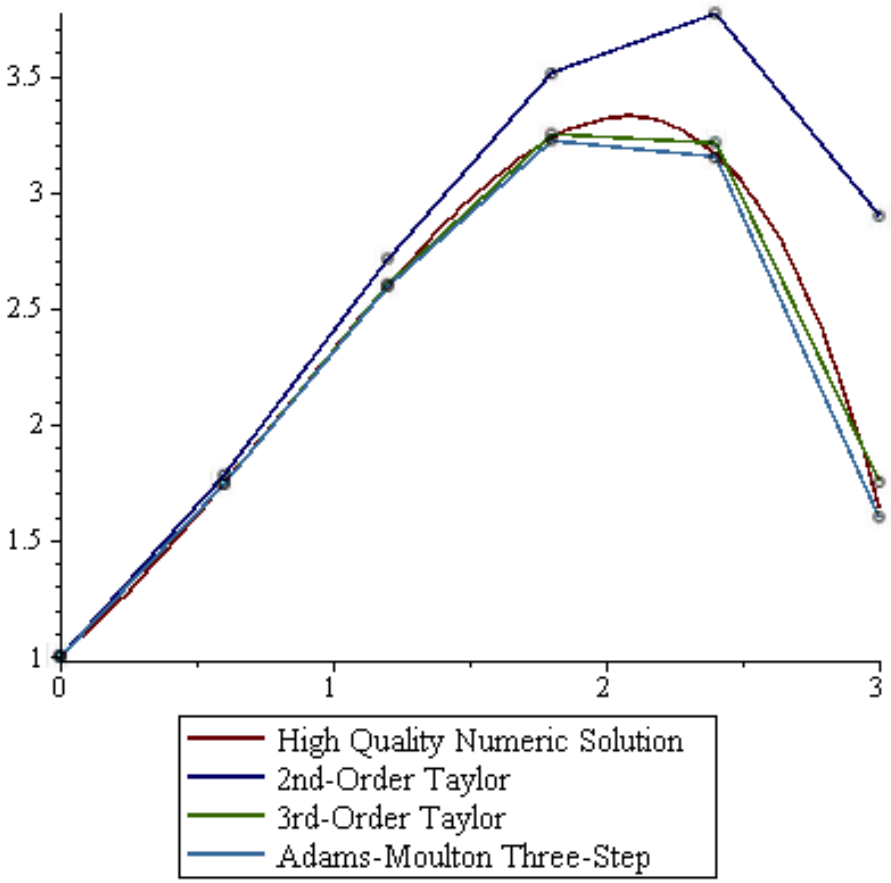
> $InitialValueProblem(DE2, y(1) = 3.10, t = 5, method = rungekutta, submethod = rk4, comparewith = [[taylor, 2]], output = information, digits = 3)$

t	[Maple's numeric solution]	[R-K 4th Ord.]	[Error]	[2nd-Ord. Taylor]	[Error]
1.	3.10	3.10	0.	3.10	0.
1.80	3.77	3.77	0.00240	3.74	0.03
2.60	5.03	5.03	0.00398	5.03	0.
3.40	6.60	6.60	0.00283	6.68	0.08
4.20	8.01	8.01	0.00330	8.17	0.16
5.	8.90	8.90	0.000656	9.09	0.19

> $InitialValueProblem(DE2, y(1) = 3.10, t = 5, method = rungekutta, submethod = rk4, comparewith = [[taylor, 1], [taylor, 2]], output = plot)$



> *InitialValueProblem*(*DE3*, *y*(0) = 1, *t* = 3, *method* = *taylor*, *order* = 2, *comparewith* = [[*taylor*, 3], [*adamsmoulton*, *step3*]], *output* = *plot*)


3.5
3
2.5
2
1.5
1
0
1
2
3
High Quality Numeric Solution
2nd-Order Taylor
3rd-Order Taylor
Adams-Moulton Three-Step

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