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15. Numerical Analysis and Scientific Computing

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A Class of Generalized Trapezoidal Formulas for the Integration of y'=f(x, y)

A one-parameter family of generalized trapezoidal formula (**GTFs**) is introduced, which include both the **A**-stable classical arithmetic mean (**AM**) trapezoidal formula and an **L**-stable modified arithmetic mean (**MAM**) trapezoidal formula of Chawla and Al-Zanaidi [1]. The generalized trapezoidal formula (**GTFs**) include both the **AM** and **MAM** trapezoidal formula as special cases. A **GTF** can switch from an **A**-stable to an **L**-stable method depending on parameter values, and it is shown to perform, for certain selection of the parameter values, better than **AM** and **MAM** formula for the integration of examples of the stiff systems considered.

Reference: [1] Chawla, M. M. and Al-Zanaidi, M. A., New L-stable modified trapezoidal formula for numerical integration of y'=f(x, y), Intern. J. computer math. ,Vol. 63 pp. 279-288.