

Homework II : Finite difference approximation of $\frac{d^2T}{dx^2} = S(x)$

Numerical approximation is not an elegant subject. It is a collection of technical details and dirty work.

However, is the more convenient way to solve real world problems.

WILL BE COLLECTED AT 18 MARCH 2009 , 10H (PAPER WRITING ONLY).

One step Runge-Kutta methods : RK3 family

$$A^{n+1} = A^n + \delta t \alpha_0 \mathcal{F}(\tilde{A}^n) + \delta t \alpha_1 \mathcal{F}(\tilde{A}^n + \delta t \theta_0 \mathcal{F}(\tilde{A}^n + \delta t \theta_1 \mathcal{F}(A^n)))$$

- Find $\alpha_0, \alpha_1, \theta_0$ and θ_1 such as to obtain a third's order accurate method.
- For a set of parameters that gives a third's order accurate method, check the stability (advection and advection-diffusion).