Introduktion to Numerical Analysis

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Contents

1 What this course will encompase

- Non-linear algebraic equations
- Numerical Integration
- Gaussioan elimmination
- QR methods
- Iterative methods
- Error analysis
- ODE Theory

2 Simple Climate model

Shortwave Incomming FLux

$$\begin{aligned} &\text{Shortwave Incoming Flux} \;=\; \text{Longwave Outgoing Flux} \\ &S_0(1-\alpha) = \alpha T^4 \\ &T =^4 \sqrt{\frac{S_0(1-\alpha)}{\sigma}}. \end{aligned}$$

3 Transient Climate status

$$\begin{aligned} R\frac{dT}{dt} &= S_0(1-\alpha(T)) - \sigma T^4 \\ \alpha(T) &= \frac{\alpha_w + \alpha_c}{2} + \frac{\alpha_w - \alpha_c}{2}\tanh(\frac{T}{\Delta T}) \\ t &= R\int_{T_0}^{T} \frac{1}{S_0(1-\alpha(T')) - \sigma T'^4} dT'. \end{aligned}$$

Difficult integral.