

Scaling

Define $\hat{T} = \frac{T}{T_0}$

and $\tau = \frac{t}{t_r}$ where $t_r = t_{\text{relax}}$

Which makes our initial condition

$$\hat{T}(0) = 1$$

if $\hat{T} = 1 + \epsilon \Theta$ and $\epsilon = \frac{T_0 R}{E}$

and we get

$$\frac{d\Theta}{d\tau} = e^{\Theta} - \frac{\Theta}{f} \quad \text{where } f \text{ is proportional to } \frac{1}{H}$$

Now let $\tau = f\sigma$

$$\Rightarrow \boxed{\frac{d\Theta}{d\sigma} = f e^{\Theta} - \Theta} \quad \text{--- (1)}$$

for $\Theta(0) = 0$