Notes in APPM 4650
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1 Throwing out Terms

$$y' = y + x$$
$$y(0) = 0$$

assume y is the smallest.

$$y' \approx x$$
$$y \approx \frac{x^2}{2} + c$$

$c = 0$ by init condition

Now assume x is the smallest.

$$y' = y$$
$$y \approx ce^x$$

$c = 0$ to satisy ic.
breaks assumption.
tested others, but the only one that works is y is smallest.

you can take the $y = \frac{x^2}{2!}$ term and plug it into y' to evaluate.
repeat this over and over and you will get $y = e^x - x - 1$.

2 Projects

rate of reaction $e^{\frac{-E}{RT}}$ proportional to the number of molecules with sufficient energy to react.
RT $\sim$ measure of thermal energy level of room.

E activation energy for $F + 0x$ reaction!.

$$\frac{PV}{h} = RT$$

$A_f \sim$ amount of fuel in box.

$$\frac{dA_f}{dt} = -cA_f e^{\frac{-E}{RT}}$$

Conservation of energy.

$$\frac{d}{dt}(\text{thermal energy in box}) = \dot{Q}_{\text{all}}$$

fuel reaction.

$$\Delta E = Q + (W = 0)$$
$$\rho c_p \frac{dT}{dt} = -c\frac{dA_f}{dt}$$