

Week 5

$$MFB = 1 - e^{-a \left(\frac{\theta - \theta_0}{\Delta\theta} \right)^{M+1}}$$

a is a Constant

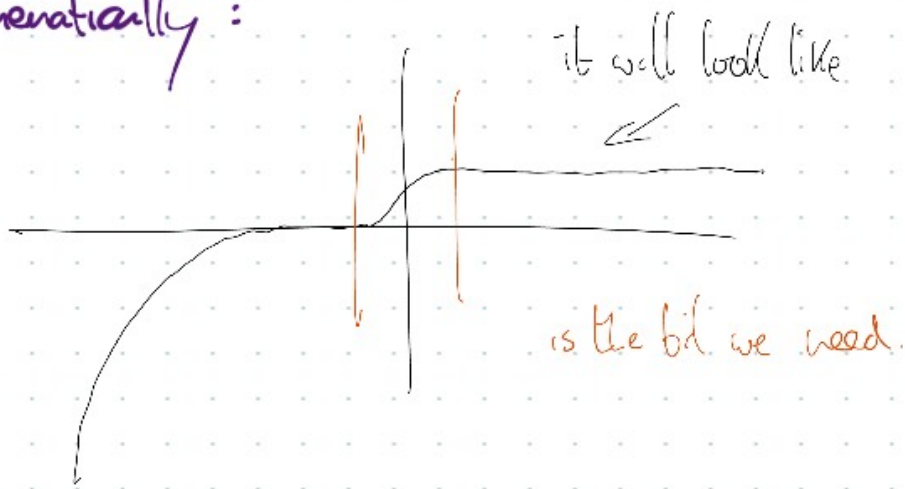
M is a Constant

θ is Crankangle

θ_0 is Start of Combustion

$\Delta\theta$ is Burn Duration

Mathematically :



from the Wiebe function we can get
Burn Rate $(w_2 - w_1)$

And from this we can get Heat Released

$$Q = \text{Mass} \times \text{Calorific Value} \times \text{Combustion Efficiency}$$

$$Q = (\text{Total fuel mass} \times \text{Burn rate}) \times \text{Cal. Val} \times \text{eff.}$$

To calculate the Combustion pressure
we use

$$P_2 = P_1 \left(\frac{V_1}{V_2} \right)^\gamma + \frac{dQ_r (\gamma - 1)}{V_2}$$

dQ_r = Heat Released

γ = Ratio of Specific Heats

Work Done ?

$$WD = PdV$$

= Pressure $\times$ Change in Vol

for temperature

$$PV = nRT$$

$$T = \frac{PV}{(m_s + m_{air}) R}$$

To Calculate ΔT

use $Q = mc \Delta T$

$$\Delta T = \frac{Q}{m c}$$

m = Total mass

c = Specific heat capacity
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