(dQ)/(dt) = (kA(T\_{1} –T\_{2}))/L

(dQ)/(dt) is thermal current

dQ = -msdT dT is the temperature of cooling

(dT)/(dt) = (kA(T\_{1} – T\_{2}))/(msL)

(dT)/(dt) is rate of cooling

Thermal resistivity = 1/k

I = (v\_{2}-v\_{1})/R R = (rhoL)/A= 1/kL/A

Energy flux = (dQ)/(dt)1/A

&image&

r1

T1

T2

r2

T\_{1} > T\_{2}, so heat flows out from center to outised surface

(dQ)/(dt) = (T\_{1} – T\_{2})/R

R = (r\_{2} – r\_{1})/(r\_{1}r\_{2}4pik)

&image&

Series

T1

T2

A l1 l2

K1 k2

R = 1/k\_{e}(l\_{1} +l\_{2})/A = R\_{1} + R\_{2}

K\_{e} = (k\_{1}k\_{2}(l\_{1} +l\_{2}))/(l\_{1}k\_{2} + l\_{2}k\_{1})

Parallel

A1 l k1

T1

T2

A2 k2

1/R\_{e} = 1/R\_{1} + 1/R\_{2}

K\_{e} = (k\_{1}A\_{1} + A\_{2}k\_{2})/(A\_{1} + A\_{2})

Rocket case(or similar)

F\_{thrust} –mg = ma f\_{thrust} = (dm)/(dt)\* v\_{rel}

Stefans law (black body)

(dQ)/(dt) = AsigmaT^4

Other bodies (dQ)/(dt) = eAsigmaT^4

e = a = 1 for black body

Rate of cooling

(dT)/(dt) = (-eAsigma)/(ms)(T^4 – T\_{s}^4)

Newtons cooling: T\_{s} approx. T

(dT)/(dt) propto (T – T\_{s})

Weins black body:

Toatal radiation power = sigmaAT^4

Displacement law

lambda\_{m}T = b

fifth power law

I\_{m} propto T^5