20 Nov 2018

$$\int_0^{\omega} w(x)H(x)\,dx = \int_0^{\omega} \mu(x)\,l(x)\,e(x)\int_0^{x} \mu(t)\,dt\,dx$$

$$= \int_0^{\omega} \mu(x)\int_x^{\omega} \mu(t)\,l(t)\,e(t)\,dt\,dx$$

$$= \int_0^{\omega} \mu(x)\,l(x)\int_x^{\omega} \mu(t)\,\frac{l(t)}{l(x)}\,e(t)\,dt\,dx$$

$$= \int d(x)\,e^{\cdot+}(x)\,dx$$

$$\int_0^{\omega} w(x)\bar{H}^{+}(x)\,dx = \int_0^{\omega} \mu(x)\,l(x)\,e(x)\,\frac{e^{+}(x)}{e(x)}\,dx =$$

$$= \int_0^{\omega} d(x)\,e^{\cdot+}(x)\,dx = e^{+\cdot+}$$

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$$\int w(x)\, H(x)\, dx = \int w(x)\, \overline{H}^+(x)\, dx = \int_0^\infty d(x)\, e^+(x)\, dx$$

$$= \int_0^\infty d(x) \int_x^\infty d(t)\, e(t)\, dt$$

$$= \int_0^\infty d(x)\, e(x) \int_0^x d(t)\, dt\, dx$$

$$= \int_0^\infty d(x)\, e(x)\, \big(1 - \ell(x)\big)\, dx$$

$$= e^+ - \int_0^\infty d(x)\, e(x)\, \ell(x)\, dx$$

$$= e^+ - \int_0^\infty d(x)\, \cancel{\ell(x)} \cdot \frac{\int_x^\infty \ell(t)\, dt}{\cancel{\ell(x)}}$$

$$= e^+ - \int_0^\infty \ell(x) \int_0^x d(t)\, dt\, dx$$

$$= e^+ - \int \ell(x) \cdot \big(1 - \ell(x)\big)\, dx$$

$$= e^+ - e_0 + \frac{e_0}{e_0} \int \ell(x)^2$$

$$= e^+ - e_0\, (1 - \overline{\ell})$$

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Key Formulas

new
*

$H =$

$H^{\dagger} =$

$w(x) =$

$e^{\dagger} =$

$$\dot{e} = \int w(x)\,\rho(x)\,dx = \frac{\int w(x)\,\rho(x)\,dx}{\int w(x)\,dx} \cdot \int w(x)\,dx = \tilde{\rho}\, e^{\dagger}$$

$$\int_0^\infty w(x)\,H(x)\,dx = \int_0^\infty d(x)\,e^{\dagger}(x)\,dx = e^{\dagger\dagger}$$

$$\int_0^\infty \frac{d\,\ell(x)}{dy}\,dx = \int_0^\infty \dot{\ell}(x)\,dx = -\int_0^\infty \ell(x)\,\frac{d\,H(x)}{dy}\,dx$$

$$= -\int_0^\infty \ell(x) \int_0^x \frac{\frac{d\mu(t)}{dy}}{\mu(t)}\,\mu(t)\,dt\,dx$$

$$= \int_0^\infty \rho(x)\,\mu(x) \int_x^\infty \ell(t)\,dt\,dx$$

$$= \int_0^\infty \rho(x)\,\mu(x)\,\ell(x)\,e(x)\,dx$$

More generally

$$\int_a^\infty \dot{\ell}(x)\,dx = \int_a^\infty \rho(x)\,\mu(x)\,\frac{\ell(x)\,e(x)}{\ell(a)}\,dx$$

note

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pm

Because $e^{+} = \int_0^\infty \mu(x)\, l(x)\, e(x)\, dx$

$$= \int_0^\infty \mu(x) \int_x^\infty l(t)\,dt\,dx,$$

$\therefore$

$$\dot{e}^{+} = \int_0^\infty \dot{\mu}(x) \int_x^\infty l(t)\,dt\,dx$$

$$+ \int_0^\infty \mu(x) \int_x^\infty \dot{l}(t)\,dt\,dx$$

$$= -\int_0^\infty \rho(x)\,\mu(x)\,l(x)\,e(x)\,dx$$

$$+ \int_0^\infty \mu(x) \int_x^\infty \frac{\rho(t)\,\mu(t)\,l(t)\,e(t)\,dt\,dx}{l(x)}$$

$$= -\int \rho(x)\,w(x)\,dx$$

$$+ \int_0^\infty \rho(x)\,\mu(x)\,l(x)\,e(x) \int_x^\infty \mu(t)\,dt\,dx$$

$$= -\dot{e}$$

$$+ \int \rho(x)\,w(x)\,H(x)\,dx.$$

check signs

$\therefore \dot{e}^{+} + \dot{e} = \int \rho(x)\,w(x)\,H(x)\,dx.$

Let $\tilde{H} = \dfrac{\int \rho(x)\,w(x)\,H(x)\,dx}{\int \rho(x)\,w(x)\,dx}$, $\leftarrow = \dot{e}$

Then $\dot{e}^{+} + \dot{e} = \tilde{H} \cdot \dot{e}$.

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JWV

$$\dot\eta = \frac{\dot e}{e_0} - \frac{\dot e^{+'}}{e^{+'}}$$

$$\therefore \dot\eta = \frac{\int \rho w \, dx}{e_0} - \frac{\dot e^{+'}}{e^{+'}}$$

$$\dot e^{+'} = \int \rho w H \, dx - \dot e$$

$$\therefore \dot\eta = \frac{\int \rho w \, dx}{e_0} - \frac{\int \rho w H \, dx}{e^{+'}} + \frac{\int \rho w \, dx}{e^{+}}$$

$$= \int \rho w \underbrace{\left[\frac{1}{e_0} - \frac{H}{e^{+'}} + \frac{1}{e^{+}} \right]}_{= W}$$

Hence, a^{+} is given by

$$\rho w \left[\frac{1}{e_0} - \frac{H}{e^{+'}} + \frac{1}{e^{+}} \right] = 0$$

$$\Rightarrow \frac{H(a^{+'})}{e^{+}} = \frac{1}{e_0} + \frac{1}{e^{+}}$$

$$\Rightarrow H(a^{+'}) = \bar H + 1$$

When $\bar H = 1$, then a^{+} at zero. If $\bar H > 1$, then no a^{+}

but this should be $1 - \bar H$

or $\bar H - 1$

So W should be $\cancel{\frac{1}{e_0}} + \frac{H}{e^{+'}} - \frac{1}{e^{+'}}$ no