atrik aussou Das a linear transform Leu Tven (D) ? V=R->R D: V -> V const O $H_6(D, O_F, O_F) = DO_F = O_F$ & $H_2(D, +_F, +_F) \equiv \forall f, g: V. D(f+_Fg) = Df +_F Dg$ & $H_1(D, neg, neg) \equiv \forall f: V. D(negf) = neg(Df)$

 $DSL \rightarrow \delta \sigma \lambda$

Patrik Jausson Das a linear transform V=R>R Lintran(D)! $D: V \rightarrow V$ Ho (D, zero_, zero_) = D (const 0) = const 0 $H_2(D, (+_F), (+_F)) \equiv H_1, g:V. D(f+_Fg) = Df +_F Dg$ $H, (D, neg, neg) \equiv H_2:V. D(negf) = neg(Df)$

DSL→ δσλ

Patrik Jausson Das a linear transform 5:R $g_5:R \rightarrow R$ $D: V \rightarrow V$ qst = exp(-s,t)Examples: exp:R->1R Dast = exp (-s.t) . (-s) Dexp = exp =-5.95 t $)g_5 = 17 \rightarrow -s.g_5t$ scale_: R->V->V = scale_ (-s) 95 scale = c f = t -> c + t DSL -> Box

 $D_{e}^{2T_{e}}$ $J_{e}^{T_{e}}$

Patrik Jausson Das a linear transform $D:V\rightarrow V$ Examples: v=exp:R->/R Deep = exp let qs (t) = exp(-s.t) then 9: V for every s:1R D gs = \t-> -s.exp(-s.t) = scale (-s) gs

 $DSL \rightarrow \delta\sigma\lambda$

Patrik Jausson Das a linear transform D: V->V Examples: v=exp:R->1R Deep = exp D 93 = scale (-5) 95 $g_s(t) = exp(-s \cdot t)$ $g_s(0) = exp(-5.0)$ D(f.g) = Df.g + f.Dg $DSL
ightarrow \delta \sigma \lambda$

Patrik Jausson as a linear transform D(f.g) = Df.g + f.Dg If x =)f = Sf(t)df $I(Df)x = \int_{0}^{x} f'(t)dt = \left[f(t)\right]_{0}^{x} = f(x) - f(0)$

DSL→ δσλ

Patrik Jausson I as a linear transform $D:V\to V$ D(f.g) = Df.g + f.Dg I: V > V x $If x = \int f = \int f(t)dt$ I(Df) x = fx - fo $DSL
ightarrow \delta \sigma \lambda$ $=f(x)\cdot g(x)-f(0)\cdot g(0)$ $DSL^{solMath}$

Patrik Jausson I as a linear transform $D:V\to V$ D(f.g) = Df.g + f.Dg T: V > V x $If x = \int f = \int f(t)dt$ I(Df) x = fx - fo I(D(f.g))x=(f.g)x-(f.g)0=I(Df.g)x+I(f.Dg)x

DSL→ do∧

Patrik Jausson Towards baptace (f.g) x - (f.g) 0= I(Df.g)x+I(f.Dg)x let $g = g_s = 1 + e^{-st}$; $Dg_s = scale(-s)g_s$ Assume $(f \cdot g_s)_X \rightarrow 0$ as $x \rightarrow \infty$ scale(-s) $(f \cdot g_s)$ 0-f0.gs0=I(Df.gs)=+I(f.scale(-s)gs)= $-f0 = I(Df \cdot g_5) \infty - s \cdot I(f \cdot g_5) \infty$

DSL→ δσλ

Patrik Jausson Towards Laplace (f.g)x-(f.g)0=I(Df.g)x+I(f.Dg)x let g = qs = \t -> e^-st; Dgs = scale (-s) qs Assume (t.gs) x -> 0 as x ->0 0-f0.gs0=I(Df.gs) = +I(f.scale(-s)gs)= $-f0 = I(Df \cdot g_s) \infty - s \cdot I(f \cdot g_s) \infty / Lfs = I(f \cdot g_s) \infty$ -f0=L(Df)s-s-Lfs = SP.gs L(Df) s=-f0+s.Lfs

Patrik Jausson Towards Laplace (f.g)x-(f.g)0=I(Df.g)x+I(f.Dg)x let g = qs = \t -> e^-st; Dgs = scale (-s) qs Assume (f.gs) x > 0 as x >0 0-f0.gs0=I(Df.gs) = +I(f.scale(-s)gs)= $-f0 = I(Df \cdot g_s) \infty - s \cdot I(f \cdot g_s) \infty$ $-f0 = L(Df)s - s \cdot Lfs \qquad (et Lf s = I(f \cdot g_s) \infty$ $L(Df)s = -f0 + s \cdot Lfs \qquad (R \rightarrow R) \rightarrow R \rightarrow R \leftarrow C$ DSL→ δσλ

Patrik Jausson baplace transform 9st = e-st Lfs=I(f.gs)~ Assume fx. gs x > 0 as x >0 = Sf(+)·e s·t V× R->R L(Df)s=-f0+s.Lfs Wx C->C L: V -> W Lin Traus (L, V, W) (exercise!)