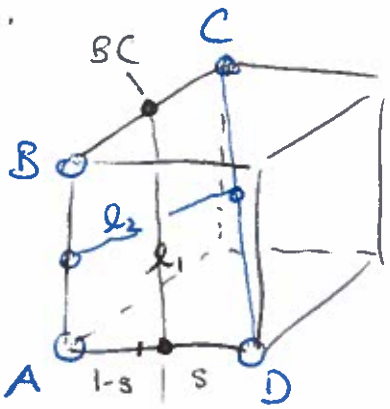
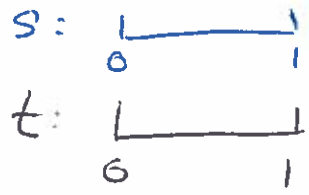


(1A)

$s = \frac{1}{2}$



Do the lines $\ell_1 \ell_2$ intersect?

ℓ_1: $BC = \frac{B+C}{2}$ $AD = \frac{A+D}{2}$

ℓ_2: $BA = \frac{A+B}{2}$ $CD = \frac{C+D}{2}$

$(1-t)\frac{B+C}{2} + t\frac{A+D}{2}$

$(1-s)\frac{B+A}{2} + s\frac{C+D}{2}$

ℓ_1 $\frac{t}{2}A + \frac{1-t}{2}B + \frac{1-t}{2}C + \frac{t}{2}D$

ℓ_2 $\frac{1-s}{2}A + \frac{1-s}{2}B + \frac{s}{2}C + \frac{s}{2}D$

therefore:

$\frac{t}{2} = \frac{1-s}{2}$, $\frac{1-t}{2} = \frac{1-s}{2}$, $\frac{1-t}{2} = \frac{s}{2}$, $t = 1-s$

$\ell_1 \cap \ell_2 = \frac{A+B+C+D}{4}$

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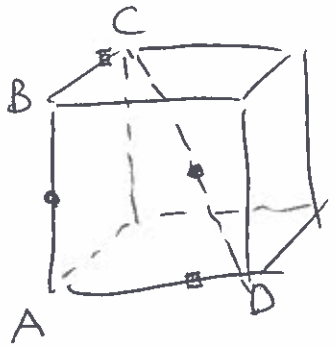
more general (1B) "bi-linear" average



$(1-t)\left[(1-s)A + sB\right] + t\left[sC + (1-s)D\right]$

$= (1-s)\left[(1-t)A + tD\right] + s\left[(1-t)B + tC\right]$

for every (s,t) we get a different point