lecture 6

$$N \cdot (p - q) = 0$$

plane equation

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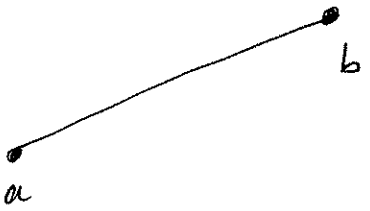
parametric line equation

line equate

$$p = a + t(b - a)$$



Substitute p into equation for plane

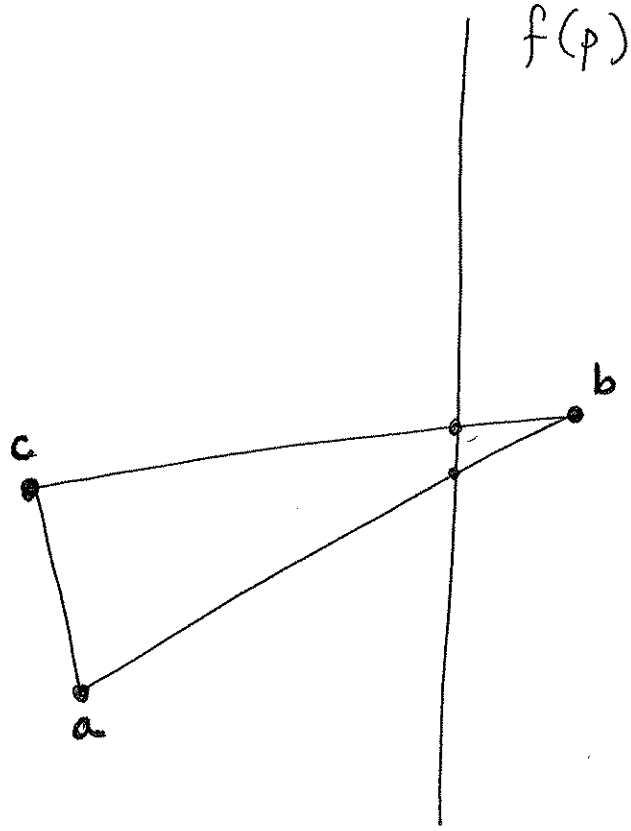
$$N \cdot (a + t(b-a) - q) = 0$$

Solve for t:

$$N \cdot a + t\, N \cdot (b-a) = N \cdot q$$

$$\Rightarrow \quad t\, N \cdot (b-a) = N \cdot (q-a)$$

$$\Rightarrow \quad t = \frac{N \cdot (q-a)}{N \cdot (b-a)} \qquad (N \cdot (b-a) \neq 0)$$



$P_1(s) = c + s(b-c)$

$P_2(t) = a + t(b-a)$

$f(P_1(s)) = N \cdot (c + s(b-c) - q) = 0$

$N \cdot (s(b-c) + c - q) = 0$

$s\ N \cdot (b-c) = N \cdot (q-c)$

$\Rightarrow$ $\boxed{s = \dfrac{N \cdot (q-c)}{N \cdot (b-c)}}$ (assumes $N \cdot (b-c) \neq 0$)

$f(P_2(t)) = 0$

$\boxed{t = \dfrac{N \cdot (q-a)}{N \cdot (b-a)}}$ (assumes $N \cdot (b-a) \neq 0$)