

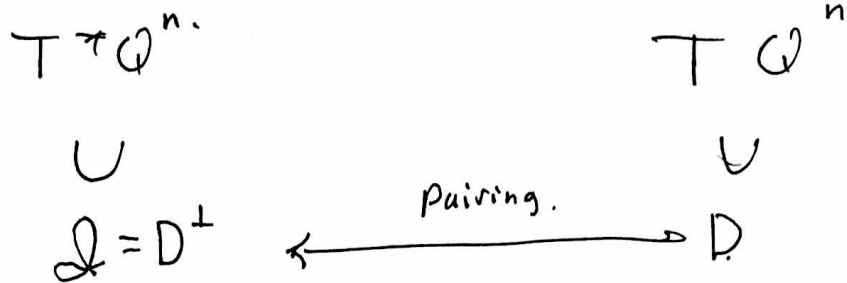
L10

B.

1

vector bundles.

subbundles



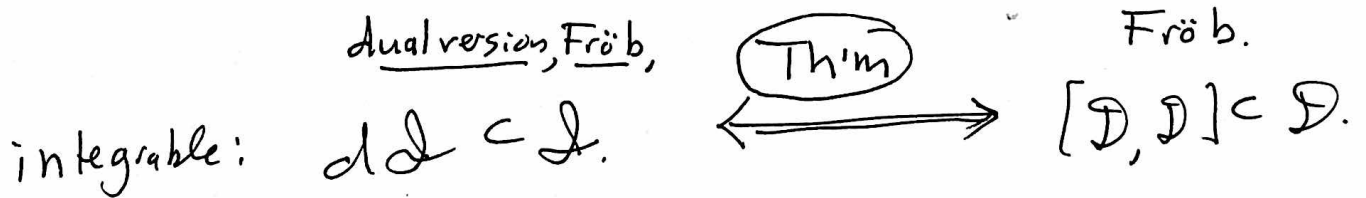
locally:

$$\theta^1, \theta^2, \dots, \theta^c$$

$$X_1, X_2, \dots, X_k$$

$$k+c=n.$$

$$\theta^i(X_j) = 0.$$



$$\mathcal{I} = \text{ideal in } \Omega(Q)$$

generated by  $\theta$

eg: a single 1-form

$$\begin{aligned}
 d\theta \in \mathcal{I} & \iff d\theta = f\theta \\
 & \iff \theta \wedge d\theta = 0.
 \end{aligned}$$

Pf Thm

uses only.

$$d\theta(v, w) = v\theta(w) - w\theta(v) - \theta([v, w])$$

$\Rightarrow \mathcal{D}$ , given w/  $[\mathcal{D}, \mathcal{D}] \subset \mathcal{D}$ .

local frame  $X_a$  of v-flds

so  $X_a(q) \in \mathcal{D}_q$ .

$$\& [X_a, X_b]_q = \sum c_{ab}^d(q) X_d(q). \quad (*)$$

$\theta^\mu$  annihilating forms

$$\theta^\mu(X_a) = 0, \quad \mu=1, \dots, c$$

$$a=1, \dots, k.$$

$$d\theta^\mu(X_a, X_b) = \underbrace{X_a \theta^\mu(X_b)}_0 - \underbrace{X_b \theta^\mu(X_a)}_0 - \theta^\mu([X_a, X_b])$$

Now since by (\*)

$$d\theta^\mu(X_a, X_b) = -\theta^\mu(\sum c_{ab}^d X_d)$$

$$= -\sum c_{ab}^d \theta^\mu(X_d)$$

$$= 0.$$

Have proved: if  $\mathcal{D} \subset [\mathcal{D}, \mathcal{D}]$  then

$$\theta \in \mathcal{D}^\perp \Rightarrow d\theta \text{ kills } \Lambda^2 \mathcal{D}.$$

↑  
lin. mult. pler  
of  
 $X_a \wedge X_b$

$$X_a, X_b \in \mathcal{D}.$$

linear algebra at a point: Now.

$$S \subset W.$$

$$S^\perp \subset W^*.$$

$$\omega \in \Lambda^2 W^*.$$

$$\omega(s_1, s_2) = 0 \quad \forall s_1, s_2 \in S$$

$$\Leftrightarrow \omega = \sum \theta^i \wedge \alpha_i$$

$\theta^i$  basis for  $S^\perp$ .

$$\Leftrightarrow \omega \equiv 0 \text{ Mod } S^\perp$$

$$\Leftrightarrow \omega \in \langle S^\perp \rangle$$

$$\left[ \text{us: } d\theta^a = \sum c_{be}^a \theta^b \wedge \theta^e. \right.$$

LB

5

Angular momentum zero & 3 body  
& cats . . . . ,

left over

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Milnor

Heis.

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Darboux & Cartan rank.

$$\Theta \wedge d\Theta^r$$

Extremals: integrably

contact or ps-contact.

in terms of solus to Pfaff eqns

maxima:  $n-1$  dim

min.  $[\frac{n}{2}]$  dim.