Massonupol Soboler completions - B cpt mfd, din B, h, (B,g) Riemannian - W -> B vbdl, A ang conn'n on W SGSZK(B,W)= T(B, 1k+B+8W) - V(f&g) = VA f&g + f& VA, g is extension - we also want a scalar product (any pos.def.)
on Wyso we may talk abt (S(x))= (S(w,sn)) -on St (B, w) define norms -this is a norm on Ste(B, W) -we denote by $L^{P_{K}}(\Omega^{l}(B, w))$ the completion of $SL^{l}(B, w)$ wit $||.||_{L^{P_{K}}}(SL^{o}(w))$ - notation: $L^{P_{K}}(W) := L^{P_{K}}(SL^{o}(w))$

-let w(p,k):=k- n -let w, W! -> B 2 v6d(s -clearly so(w) & so(w) mult. so(w & w!) The (Sobolev multiplication than) $LP_{K}(W) \otimes LP_{K}(W') \xrightarrow{mdt} Lq(Warw'), it$ w(psk)+w(p',k')>w(q, s), min(k,k') 25, is cont. (bounded) operation

Th- (Sobolev embedding thm)

LPK(W) cis LP'KI(W) is bounded 1+ w(k,p)>20((c1,121), kzk1. Moreovers it lezel, à 15 compact.

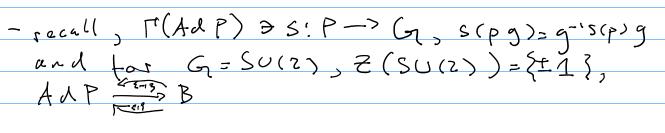
- letting, & T(W) = Space of all sector's we get LPK(W) Ept. 2 (W) if 26(K,p) 21.

- -armed with this...

 -recall d(P) = aff, space over 52'(adP),

 where P=>B G-pbdl, G-cpt mtrx gp, Boptand
- def. $A_{L_{K}}(P) = \{A + \alpha \mid \alpha \in L_{K}(\Sigma'(adP))\}$
 - Banach mfd. (with 1 charts)

- secall AdP = P × 119 G(P)= M(AdP) = gp of gauge transformation the "gauge gp", G(7) gp of gauge to's



-want to extend to Banach (mfd) Lie gp GLPK (P) = LPK (AdP)

- now, we Rak this is Hilbert sp. - however, we are interested in

 K=2, p>2, h=4 (in p=2, 512 not compact)
- notice L32(W) SEThe CO(W)
- so Gl32(P) will be grunder mult. of (cont.) sectas
- -let TG 13 (P):= L32 (adP) Lie alg. 2 fibrewise bracket
- -exp: L3 (adp) -> GL32 (P) defined
 fibrouise is bijection in nold of 213-section
- we stop writing k, e.g. ot(2(P):= tz(P)
- action t2(P) x 93(P) -> A2(P) -check: w(1,2),6 ~ (3,2),0 ~ (2,2),00
 - this works, and even is smooth (wonlt prove)
- note in passing that Ety F, E, F Barach, f is called differ to E & f & bounded in op defi & > F & f. | 1 + 1x+h)-f(x)-(dat)(WII) = 1 (h)(1)