housdoff center for mathematics

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Example $(L_{12}): W = \{x \in \mathfrak{g} _{2} \mid del(x) = hr(x) = 0\} = \{(a \land a) \mid -a^{2} \land b \in 0\}$ Fact of W is irred The following of the W and W are W and W and W and W are W are W and W are W are W and W are W and W are W are W and W are W and W are W and W are W are W and W are W are W and W are W are W and W are W are W and W are W are W and W are W are W and W are W and W are W and W are W and W are	_	1.56	VIII (BO IOXI)			(,,,,	(on g-1	ers).	1/10/1	
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Ex (GL_x) : MM $G/B = GL_x/(x^*x) \cong IP^A$ $N = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b)) (a b)(y) = 0, -a^2-bc = 0$ $V = \frac{1}{2}([u,v], (a b), (a b)(y) = 0, -a^2-bc =$					O .	0 0		, No	= Springer	- nadu
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Proof $x \in \mathcal{N} \cap Ad(g)(e)$ $\Leftrightarrow x = gbg^{-1} \text{with} b \text{i.e.} b = \begin{pmatrix} 0 & b \\ 0 & 0 \end{pmatrix}$ Scholack cells. $1p^{-1} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \cup \begin{pmatrix} x & 1 \\ 0 & 1 \end{pmatrix}$ $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \sim x \in \mathcal{N} \sim x = \begin{pmatrix} 0 & x \\ 0 & 0 \end{pmatrix} \Rightarrow \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$								-03	011	3
Proof $x \in \mathcal{N} \cap AJ(q)(e)$ $\Leftrightarrow x = qbq^{-1}$ with $b = (b =$				c -a))	(c-a)	() (1	3	\mathcal{Q}	1)
Proof $x \in \mathcal{N} \cap AJ(g)(e)$ $\Leftrightarrow x = ghg^{-1}$ with $b = (0, b)$ Shobert cells: $1P^{-1} = (1, 0)$ $U(x, 0)$ $(1, 0) = x \in \mathcal{N} \cap x = (0, 0) \Rightarrow [u, v] = [u, v]$						1 - 12	(2)	4	2 3 4	4//
Shobert cells: $18^{1} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ $(2 & 1)$ $(3 & 1)$ $(3 & 1)$ $(3 & 1)$ $(4 & 1)$		N				. p. 8-10	34,5	1 13 51	0	_
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$\begin{pmatrix} x & 1 \\ 1 & 0 \end{pmatrix} \xrightarrow{\sim} X = \begin{pmatrix} \alpha & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} 0 & b \\ 0 & 0 \end{pmatrix} \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix} = b \begin{pmatrix} -\alpha & c^2 \\ -1 & 0 \end{pmatrix} \Rightarrow \hat{L}^{\alpha_1 \alpha_1} = \hat{L}^{\alpha_1 \alpha_2}$			(100)	~ XE J	/ ~ x=	(%%)	= [u:v]	= [1:0	1	
			(*1)	2 X = (!	21)(0	6) (0-1)	= b- (-a	c (0	[4:0] = [0	[Name
					0 1	- ' 0	1,	1		

Fact 1) priving N is smooth and proper ([CG, Prop 2,42 3.1.34]) ([CG, Lema 3.2.2]) 2) N = T* 6/B \$2 The Springer (perrese) sheaf Lemma 1) po: W - W is semismall (but the stratification by G-orbits) 2) W: g - g is small with grs & g. Proof only 1), is very similar (see [Acher 8.2.57). Let Z = N x N Steinberg vortely = {(g, B, g, B, x) & B x N | X & Adlan (&) \square Adlan (&) \square Adlan (&) Fact F. X-y is senished to dim Xx, X & dim X J. Schubert cell of G/B= B no suff to show din 2 & din N. we was let 30 = {(9,8, 9,8, x) € } | 94 92 B € BwB} => 2 = U 2m , 2m loc closed (As _s svit to show dim 2m & dim W VW. Fix we W (repr. we No. (T)). Note: Zw = 6 x (m Add (w)n) (88, 9, B, A)(3X)) (9, x) => dm Zw = dm 6 - dim (Bn & Bir) +dim (nn 4d(ii)n) Note: Lie (Bn iBi") = go (m n Ad (i) (m)) => din zu e din G - din & - dim (n Ad(i) (n)) + dim (n Ad(ii) n) = dim G - dim & = dim W For 2): 2'= gxg g = Uzw, zw' = Gx 8 no Bir (& A 40(0)(0)) modern zw' = dmg 2"= { (s,B, s,B, x) ez' | x dgro} . 2" = 2" n2" 12 Z" = 6x Bni Bi (& N Ad (i) & N & 18K)) \$ = 9rs eg open = dim g/grs < dim g = din ?" + dim zw = dimg bu Rest follows by choosing an appropriate strok freehen of grs (Fiber dim thm). TI Lemma Appra = gr - gr is a covering map with deck transforms = W Proof tros = & ngn, fr= & ngr ~ gr - 6x tr cares. Get 6 x 7 grs -> 6xB trs = grs bijedian => 100 (Zarishi mainthmi, grs hormal) W Q GAT grs by w. (gT, x) = (gir T, Ad(ii)(x)) Free advan . Get Gat Son - Galler Garages (GAT Brs)/w = 31 8rs (Sull to check hij: see othere) But for x egrs, | | (x) = | (4,8 & B | x & Ad (q) (f) } | = | w| rey, ss. x lies in precisely a unique Contran, and each Contralles in [W] Borels. Def The Springer sheat is Spr = W* Ex [din N] Leurny Spr & Perr (W). is semistimple. Blear N = W & semismall. => W* Evi Edin W] persone: Somisimple by Decomp 74mm. [] broot

housdorff CENTER FOR MATHEMATICS

Hore Lrs: K[w]-moding -> K[n,(an, x)] moding -> Locat (are, a)

Lemme ((or of prov. Lemme): 1) Nrs & Grs # Lrs (M. [~]) 2) W. Q. E. J. W. S. T. = 1 C (3 cs. Wes. & Q. S. S.) 3) No C Thim W] = inclas 1 C (8 vs. Wisa (37) [Milli-Jin]) 1) From interaction or
2) From 1) + [Action Prop 3 8 7]
3) From 2) + proper base change of ways Proof 1) From interaction of monodromy + covering spaces Con Fd (Spr) = CEW3 Proof End (M. Ew Edin W) = End (10 (9rs, Mrs. & 3 mg) = Ed (Nos a C grs) = Endermy (CINS) = CINS D (or W 2 H (N) Proof End (u, Qui Edim NI) = End (Qui Edim NI) = H° (N) (up to shift) Rem o This action is some thing that doesn't come from W 2 W! there is no (reasonable) action of W on W o this can be used to build irreps of W (Springer correspondence) Ex Springer sheof for SL(2) = N = { (() b) ([~ v3, (a b))) (a b) (v) = 0, -a2 - bc = 0} N = { (" ") | -0 = 10 } = {0} U (N (803) Fyel 17. (N (903) = 72X22. a simple perv. shooves on W: (((0), 4) = 0 40) · p. Ed Edm W3 = 0 U 1903

=> Spr = 10 (803, 6) @ 10 (U, Irix).