\$262. LEC 6 SULTO WEIGHT SPACE 1/25/19 Rem: D HW CORRECTIONS (FRANKS LEXI) @ Jerordo: GEORGI CH. 2.4 (nb Gerrais To is ove ad Ta) -> IAN + GER, ARE RIGHT. KILLING FRM IS REALLY AROUT ANIGHT (prop of Algebra w/o "making a NEW VER SPACE") Georgi: 2d Ta = Lab 24 Th 1 DIFF BASIS "UNEAL COMB > Tr(20 To 20 Tb) . Lac bd WATER for 80ME L] Tr (84TC 24Tb) = Ka Sab (no sum) WORM OF BOILT" (or \$d Ta) GNOS MAGNITURE & Ka COMPACT 6-3 K701 3 CAN NORMAUSE BUT SIGN IS INVT. tells you about the group. * who not SU(1)? ANALOG: the easiest group: U(1) View SW Study generator: 1 (or -1 or 1 or -217 ...) woncompact groups FINITE REPLASE : e-10.1 K(1,1) = 1 - K(-1,-1), K(III), -- >0 LOPENTZY POINCALE US: generator: [i] (or -i, or itt, .-) SHOULD we pas FINITE TRANSF: e-10.1 = [e0] _ RESCAUME ON THIS! Z> non compact! & use your FAN. DEF

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	Bearack on AM.
PROG 2:	2d (Ta) bc = (-i) fabc pabc 7 = -i [79.76]
	2d (Ta)bc = -ifabc (Tc) = -([-9, Tb])
era - Jacobson and Arthur (1984) and a special and a s	7
· · · · · · · · · · · · · · · · · · ·	80 MARES.
The state of the s	
ploe 4:	it's kind of wend that a state transforms by a commutator.
	TROUSIGND IN a COMMUTATER.
encommentar - 1994 metaka uning a panaganangan pagabar sagabar Tangahar sagabar sagab	But: comes from a very intuitive finite vonstamation low:
	finite vonsternation law:
	if X is a state (Lie Algebra valued)
	ex= xata
# 1	DEFINE FINITE THANKS
	$X \rightarrow e^{-i\theta^{q}T^{q}}$
	0°01 X + BIT, X] + O(02)
To all the second secon	
	the infinitesimal transf
	IS the ADJOINT
So MHEX:	CAN MIGITE INVARIANTS H+&H +> H+O+O+OHOH
Can Combine	ochenice that inv. then take IAN.

UGHTNING REVIEW AGHN: SU(3) ALGEBRA 3 RAISEIWW T.V, U ICARTAN [Tr(H2) = = 2 CZ VERY USEFUL NOTICH WEIGHT DAG) $T^{3} = \frac{1}{2} \begin{pmatrix} 1 \\ -1 \end{pmatrix} \qquad T^{8} = \frac{1}{2\sqrt{3}} \begin{pmatrix} 1 \\ -2 \end{pmatrix}$ SPECIAL COMBOS: T3 J2 of T 2T3+12T8 - J2 of V -2 T3, ET8 - J2 of U s.t. for X = ? T*, V*, U* } $[X^{+}, X^{-}] = 2X^{3} + X^{3} = \pm X^{\pm}$ $[X^{3}, X^{\pm}] = \pm X^{\pm}$ eq. $(2T^{3}, E^{-}T^{8})$ for Vget this from [T3, X+], [TB, X+] T+, V+] = + U+ other obs:

for that sule): Heighest/LOWEST WEIGHT I INCHECIET BY 1 ALONG IN EAS TRUT WEIGHT SPACE (D, 8) & 73, T8 G/V. → ± (1,0) * (\frac{1}{2}, \frac{13}{2}) + (- - 2, 45 (P/E) from mormaliz 3 80(2) 12dder. USING "2/x is a counting # " for X=T, V, U (P, g) mx = (np/2, ng/2/2 LAST TIME: 3 BY THE WAY: THIS STATE HAS P>"PMAK"

SO WHAT: given ...
you know what each generator
does to a given ... = 17.8>

THAT IS ROTATING IN THIS REPRESENTATION

$$\begin{pmatrix} x \\ z \end{pmatrix} = x | P_1, g_1 \rangle + \cdots$$

d(Ta) (2) = x [Ta] P. 8.) + ...

Vyou know this

want this matrix

Ta is some in

comb of x# H;

so if you know what a live what does to the basis, you know what it does to basis. You know what it

DTRATERY: HIGHEST WEIGHT

DESSIBLE WAYS

NORM. WILL CRUSE THIS TO TERMINATE

Ly> mx > -jx fr x= tu,v

QUESTIONS
- what do more complicated reps look like?
- are all of these states unique?
- or me were wuripricities?

(P.8) max } are these the T+V-1P.8) max } some or different?!

WECK: T+V" = [T+V-] + V-T+

60 T+V-/MAX) = -U-/MAX) + V-T+/MAX)

ME! = 0

DEED TO SAY AGOUT THIS SIGN

CAN SEE how to generalize: same gave as before

THE XTIMAX) = 0 7 alread if prop of comowness

ARE EQUIVALENT.

	Gutandai CH. 4.1			7
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	MORE SYSCHMETIK	s Som	EMHERE	Hele
	JX >0 TINA		TIC	and the second s
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	C. M. Santa			

M this wedge relative to IMAX> -> cannot home 2 max stories (ome w sym)

THRUE TYPES OF DIABRAMS: A, V, Q. (Nex)
1 matest weight is (0, 18/2)
V- V- V6
end up w/
q: are all states unique, or is there a multiplicity? The two dats For A GNEW (P.g.)
THIS IS WHERE WE (finally) USE THE CROSS RAISE/LOW COMMUTATORS:
[TT,U-] = -V- commute To the RIGHT!
WE KNOW T - (MAX) =0 HC ÚT =0)

--- ---- --- ---

......

ALSO IMPORTANT

[T; V-] =0

[T; V-] =0

POSSIBLE MUTIPICITIES

involving only 2° V involving T

what shout modung X* for some X?

Zo treesn't give a new state

(foom "DESCENDING HODER" constr. on 80(2))

I can pr. wh (:..)

Zo think about this if need be!

D because [U; V-]=0, (U-)"(V-)" [mx>)
is the the same as any rearrangement
of the U i V sps.

D[T-, U-]=-V-
[T-, V-] = 0
ib we commute all T-is to the right, we can annihilate I max
$= (V^{-})^{m} T^{-} (U^{-})^{n} lmx > f_{T}^{-} U^{-} lmx > f_{T}^{-} U^{-} U^{-} lmx > f_{T}^{-} U^{-} U^{-} lmx > f_{T}^{-} U^{-} U^{-} lmx > f_{T}^{-} U^{-} U^{-} lmx > f_{T}^{-} U^{-} lmx > f_{T}^{-} U^{-} U^{-} lmx > f_{T}^{-} U^{-} U^{-} lmx > f_{T}^{-} U^{-} U^{-} U^{-} lmx > f_{T}^{-} U^{-} U^{-$
= (V-)M+1(U)n-1 [MAX)
continue commuting right
States of Just v-10- =0
[80]: any states we read u To ME

me leady of n. n.

2> EART WEIGHT IN & DITHERAMS

	for Hontower : show that
~	each state in V diagram is
+	unique (multiplicity are)
-	
	more about: hexagonal
1	inside the wedge of allowed IMAN)
	not on the edge
	9
	all phecusos showed on (max)
~	The state of the s
	Tuning 1
	m/x
.,	CAN SEE: & those two edges
-	have multiplicity 1
	lonly one way to reach
	them of howering ops)
-	symmetry: whole outer layer has multiplicity 1
	But next rafter than Higher unrighted !
	1. U-T-1M2 -V-
	2. V-1M2> [T-0-]1M2>
	3. T-V-/Mx> = +UT/M2->
	In some of
	1 2

Change of Residence