## LEC 25 : SHORTCUTS WI GROUP THY Cagene of molices

YOU IS

NO CLASS WED - happy Thanksgling

(AST WHEK IRREDUCIBLE REP (highest ut -> lower) · REP OF SU(2)

· TENSORS = 50(2) : 282 = 3 = 01

30303 = 10+B+B+1

## A CHOAP WAY TO DO TUMS:

RECOLL: BYM & ANCIEYM TENSORS TRANSPORM PERATEU + flus is exactly what meducible means!

A LENSON III , CONSIDER

12 (Tis + Tsi) -> v2 (RIKRSETKE # Rip Rik Tek 1

= RIL ROO TO (TO LTS)

I be necessary of 20(m)

R	MPW 7H15 TO 80(N)
F	4 2-INDEX TEMBER HAS NO COMPONENTS.
	SOME OBJECT OF PHYSICAL SIGNATIONIOS THAT TRANSFORMS UNDER SO(N)
	eg. THERY IS SO(N) SYMMETRIC, BUT STIFF ISN'T.
	T で Ai= 後(Tis - Tisi)
	しょう。一度(てら+てら) まい(ル+2)
	$\frac{1}{2}N(N+1)$
	IN FACT: Si is itself further reducible
	FSii -> ERRICK SEP = SEP SKP = SKK  (RKI) TRIP  (R') KIRIP D teans Beaus separately  (Both Separately)
	Csmylet (1)

At has 
$$\frac{1}{2}3.2 = 3$$
 components  
Si has  $\frac{1}{2}3.4-1 = 5$  components  
Sii has 1 component

MA OU MUDERALAND THIS NAME INMASIANG TENBOSES

RIKRIE 8 Ke = 815
MUARIANT!
THIS IS EXC RTR=11
(PART OF ONE DEF.
OF GROUP.)

OTHER INVARIANTS?
SO(N) > det M=1)
(3)o(N) >> det 图=1) fact: Epge-us (det 图=) & ioxm 阿ip 阿ip 阿ip 图:x
tact: Epgrus det 图 Six M 阿ip 阿ip 阿ip 阿ip 阿ip Mip 阿ip 阿ip Mip 阿ip 阿ip 阿ip
Lotally antisymm, lenser.
tolong on usylum, som
Aben: (Ep. ) = Ei-M Rip - RSM
I
- 20 Ep-19 18 an morrant.
<i>N</i>
THE INVARIANTS Sis & BITTING ARE
SHORTUS FOR DECOMPOSING TONSORS
(M)02) 48 fee X
note: You only have 2,in
YOU DO NOT ALSO GET TO

Formack: Ei...in is the tool for DUALUCY.

The bush & the tool for DUALUCY.

The manerax pieus sqr.

and the second of the second o	So ACTING ON Ti, WI SIJ GAVE TRACE.
	Tis & 15 x GIVES (N-2) comp
militardosmo está es a distinue de está esta está de está está está de está está está está está está está est	ANTISYMMETRIC TENSOR.
	expect this to be the antisymmetric part of T
	eg. Par N=4:
	To Eise = Tep, botally antisymmetrs.
	BUT WHAT ASOUT N=87.
nanii James taari taanna aa siirii ah kuuluuma na Jamesi ka 1855 ilikuw sa kalandi	
	To Empire = 7 12 - one component?
tanganah menanggan menanah milinda menanah mena	BUT: 3 DOF
	of. 3 B= 0= (Tij-Tsi)
	MORE BENEVALLY:
	Tij &ijin HAS (NCN-2 components
mananananananananananananananananananan	
r en militat kilomensan udakkanna menunungan kilomen pelaken militat da sistilah d	$\frac{1}{2!} \frac{N!}{(N-2)!} = \frac{1}{2} (N) (N-1)$
нициналууун Атадар	

## KENNAME!

80: for N=3 } 5- week tensor

Tis T & Eisk Tis " Tk, enades Tis-Tsi

Sis Tis = Tis, trace

Sis- rishis Tis = Sis, sym traceless

L'ileftoner"

3×3 = 50301

this is kind of turny 30 rotations have a rep where 5 objects transform into themselves.

Somo ramuar?

In JASX PCX) [xix] - \$80 x2)
moment of meetra foresor!

to go anything too aught home pout have half on the siling of single and the subject

og on hw: 8x3x3 = 10 & 80877 of 5U(3)
the 1 is (Eijt gigigs) totally whom.

,	
	BACK TO AN OW THEME; FUNCTION SPACES CONFICES
	80(3) => ANGUAR MOCNETUM
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	generators: Lx = [[22y-43z],
	PER AS DIFFERENTUAL of. PREVIOUSLY,
	2 (1) , or swee materices
energy and the second	these satisfy [lx, ly]=ila etc in the sense of a he Bracket
	tisonfunctions: 22 Ym(0,4) = e(e+1) Yem(0,4)  Lz yem(0,4) = m yem(0,4)
e proprie	m fact: Yem(0,4) = Ne einypem(cos 8)  Norm. AssociATED LEG.
	SPECIFICALLY, Pe 13 THE LEGENDRE POLYNAMIN
A-1104	shows up when taking
April 18 de la constante de la	$\frac{1}{ C-C' } = \frac{1}{ C-C' } = \frac{1}$

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m the abs. sens: what So(3) Sees.
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IMMINATING THE VECTOR & PUNCTION CORRESPONDINGER UNIT VECTOR V

 $V^3 = \cos \theta \rightarrow P_1(\cos \theta)$ 

SYMM. TRACELESS CONSOR TO = VIVI - 3 SII |V|2 T3"3 = cos20 - 3

- Pa (os A)

RECKLI potential \$ = 1 23 9 (5)

= ... + [ ] & P(s) + (=) P2(f.ŝ) +--

DUMPUPOLE TENFOR

ines of rotations

1	
	YOW THIS IS SHAKING OUT:
	2 3803
	Symmetry = [H,G]=0
	PB & SYM
na na ana ada an ana ainm a na ana na ainm na ann an	
nga J <sub>a</sub> nghana 4 ( Ang Ingalina ( ( ( ) ) ,	FIN OM VECSP INFINITE OM PUNZ SP.
	tense rep > (med rep)
	(dearm)
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erkkilasus en kreutensk frå tillskild å littlike en er efter (litter, skille) en kreute	Baus This is con expand
	concare (anything in eigenfur.)
and the second s	Space - well doit forest properties
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egalangan pengangan	UNDERNING BIC [H,G]=D, House enflure
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	Lurber, Dynamich Eas will
	only pot win an most prosent.
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en a mena de en	

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