

## Re: Question on Lie Groups

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On 31.01.2005 01:45, igor.kh@gmail.com wrote:

> *Tony wrote:*

>

>>*Hi everyone,*

>>

>>*Doing some problems on my own outside of class, and can't seem to get*

>

> *the*

>

>>*following :*

>>

>>*Let  $G$  be a connected Lie group, and let  $U$  in  $G$  be any open*

>

> *neighborhood of*

>

>>*the identity. Show that every element of  $G$  can be written as a*

>

> *finite*

>

>>*product of elements of  $U$ .*

>>

>>*I can't seem to figure this out.*

>

>

> *How about this. Since  $G$  is connected, there is a continuous curve from*

> *the identity to any element. Strictly speaking, this requires path*

> *connectedness, but I think for manifolds they are equivalent.*

Yes, it is.

> *This*

> *curve is homeomorphic to the unit interval  $[0,1]$  and hence is compact.*

> *If  $U$  is a neighborhood of the identity, then cover this curve by left*

> *(or right) translations of  $U$  by each group element lying on the curve.*

> *Since the curve is compact, a finite subcover can be selected. Now*

> *leapfrog between overlapping neighborhoods.*

>

> *Igor*

>

After a quick look at your argument the question came to my mind whether the image of this curve needs to be multiplicatively closed? E.g. if the curve is multiplicative, i.e. it enjoys the property of a group homomorphism.

J.