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John Baez <johnb@ucr.edu>

Pic_0

5 messages

John Baez <john.baez@ucr.edu> Mon, Mar 14, 2022 at 7:15 PM
Reply-To: baez@math.ucr.edu
To: JAMES DOLAN <james.dolan1@students.mq.edu.au>

Hi -

The book by Birkenhake and Lange assures me that *any* complex torus X has its dual X* as its Pic_0 - that is, the identity component of the Lie group of (isomorphism classes of) holomorphic line bundles on X.

This is what I said at first today. Then I started thinking it was just true for abelian varieties.

Now I think we can construct these line bundles using factors of automorphy in the usual way. I don't think we need to use the assumption that X is an abelian variety anywhere!

Best,
jb

On Mon, Mar 14, 2022, 12:40 AM JAMES DOLAN <james.dolan1@students.mq.edu.au> wrote:

> sounds reasonable ....
>
> i'm way behind schedule at the moment on doing all the things i'm supposed to be doing ....
>
> ....
> On Sun, Mar 13, 2022 at 3:19 PM John Baez <john.baez@ucr.edu> wrote:
>
> > Hi -
> >
> > Tomorrow if I get my act together I'd like to say some stuff about Riemann forms, the Rosati involution and so on. Or even if I don't.
> >
> > Best,
> > jb

JAMES DOLAN <james.dolan1@students.mq.edu.au> Mon, Mar 14, 2022 at 8:13 PM
To: John Baez <baez@math.ucr.edu>

i still need to think about this ....something confusing about non/ampleness here ....

....
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JAMES DOLAN <james.dolan1@students.mq.edu.au> Mon, Mar 14, 2022 at 9:16 PM
To: John Baez <baez@math.ucr.edu>

"i still need to think about this ....something confusing about non/ampleness here ...."

maybe it works out okay .... a complex torus that's not an abelian variety has no ample line bundles, but that deficiency can be "blamed" on "pathologicalness" of the neron-severi group, rather than on the picard variety which remains "normal" .... ??? well, i still need to think about it some more ....

....
[Quoted text hidden]

John Baez <john.baez@ucr.edu> Mon, Mar 14, 2022 at 10:17 PM
Reply-To: baez@math.ucr.edu
To: JAMES DOLAN <james.dolan1@students.mq.edu.au>
Cc: John Baez <baez@math.ucr.edu>

> On Mon, Mar 14, 2022 at 9:16 PM JAMES DOLAN <james.dolan1@students.mq.edu.au> wrote:
> "i still need to think about this ....something confusing about non/ampleness here ...."
>
> maybe it works out okay .... a complex torus that's not an abelian variety has no ample line bundles, but that deficiency can be "blamed" on "pathologicalness" of the neron-severi group, rather than on the picard variety which remains "normal" .... ???

That's what I'm hearing. And it seems reasonable.

I'm guessing that on a complex torus that's not an abelian variety, the holomorphic line bundles corresponding to the 0 element of Neron-Severi group (that is, the ones in the Jacobian, or Picard variety) have no nonzero sections - except for the trivial line bundle. Does that sound right?

Best,
jb

JAMES DOLAN <james.dolan1@students.mq.edu.au> Mon, Mar 14, 2022 at 10:47 PM
To: John Baez <baez@math.ucr.edu>

you: "I'm guessing that on a complex torus that's not an abelian variety, the holomorphic line bundles corresponding to the 0 element of Neron-Severi group (that is, the ones in the Jacobian, or Picard variety) have no nonzero sections - except for the trivial line bundle. Does that sound right?"

yes, but i still need to think about it ....

....
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