Re: Lattice visualization tool

Source: http://sci.tech−archive.net/Archive/sci.math/2007−11/msg03013.html

- *From*: quasi <quasi@xxxxxxxx>
- *Date*: Thu, 15 Nov 2007 09:05:48 −0500

On Wed, 14 Nov 2007 23:59:12 −0800 (PST), Marshall
<marshall.spight@xxxxxxxxx> wrote:

> On Nov 14, 10:00 pm, William Elliot <ma...@xxxxxxxxxxxxxxxxxx> wrote:
>
> > On Wed, 14 Nov 2007, Feng wrote:
> >
> > > Hi, is there any easy−to−use software tools to visualize a
> > > lattice (or
> > > a poset)? i.e., given a set of elements and order definition (in
> > > certain format), the software is able to display a graph
> > > presenting
> > > the relationship among the elements in an elegant way?
>
> > Yes, your mind's eye.
> > Computers can present only a few finite ordered sets.
> > Computers will do lousy presenting non−planar ordered sets.
>
> > Consider (N,|), positive intergers ordered by
> > x | y when x divides y.
>
> > It is a lattice with sup x,y = lcm x,y, inf x,y = gcd x,y
>
> > Now draw diagram for N up to 5 or 10. Use monospace font
> > and let the up direction denote greater, ie divides into.
> > For each two numbers, I've diagramed some of the sup's or lcm's.
>
> > 8
> > /|
> > 4 | 6
> > \|/|
> > 2 3 5
> > \|/
> > 1
>
> > Level 1 is 1.
> > Level 2 is primes

> Level 3 is product of two primes
> Level n is product of n − 1 primes
>
> I've started a diagram for (N,|) with only three primes for level one.
> Exercise.
> Finish the diagram for (N,|) with only three primes at level one,
> upto level 10. Take a look at the entangled view of this non−planar
> diagram. Is such a diagram of any use?
>
> Thus you'd left attempting to devise a method for visualizing
> (N,|) that's simple and intuitively clear. In general, how to
> diagram non−planar graphs onto a plane in an intuitive visual manner.
>
> I suggest you consult with printed circuit and microchip programmers to
> see what graphics they use to present or visualize their ever more a
> jumbled tangles of connections.
>
> See if their software can handle (N,|) for 10 or 100 primes at level one
> upto level 100 or 1000. Of course (N,|) is finite. Another probem would
> be displaying dense lattices, for example QxR with product order,
> (q,x) <= (r,y) when q <= r, x <= y

> You could have saved a lot of typing if you had just said "You're
> dumb and your question is dumb." You could have saved even
> more typing if you had simply not replied. All three possibilities
> provide the OP with the same amount of assistance.

No, you are way off base.

Feng's reply, while surely not a complete answer, gives some useful
information.

By explaining the key issue (non−planarity), and showing an example
illustrating why it would be difficult to automate the process, Feng
is making clear that there is a theoretical problem that needs to be
dealt with −− how to represent non−planar graphs by plane diagrams in
a satisfactory way.

That's an interesting problem in its own right. What's an appropriate
way to measure of "satisfactory"? And given such a measure, what would
be a good algorithm to find such a diagram? These are some of the
important issues.

> And here I've been wasting time thinking about lattice visualization
> software for a few days.

Ok, let's see what you've come up with?

Why don't you add to the discussion, rather than just rip away at a legitimate reply?

> Oh if only I had known that since some lattices are hard to render no one should ever consider rendering any lattice.

Feng didn't say that.

He suggested looking at software packages for printed circuit design. That seems like a good idea to me.

Of course, there may be other types of software packages for this. For example, software to graph

family trees

organizational charts

project timelines

knots

And of course, one could also try for a homegrown method. We could certainly have a discussion about possible methods, and I think that would be a worthwhile discussion.

But for this thread, Feng's reply is quite legitimate.

Your is not.

quasi
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