Re: Simple Question

Source: http://sci.tech−archive.net/Archive/sci.electronics.basics/2006−09/msg01623.html

- *From*: Jonathan Kirwan <jkirwan@xxxxxxxxxxxxxx>
- *Date*: Wed, 27 Sep 2006 23:12:55 GMT

On Wed, 27 Sep 2006 21:49:32 GMT, Rich Grise <rich@xxxxxxxxxxx> wrote:

> On Fri, 22 Sep 2006 00:23:28 +0000, Jonathan Kirwan wrote:
>
> > On 21 Sep 2006 18:06:05 GMT, Chris Foster <edolan@xxxxxx> wrote:
> >
> > > I have a simple question. This is a qustion that I was asked in
> > > a job
> > > interview.
> > >
> > > If there existed and infinite two dimewnsional array of 1 ohm
> > > resisters,
> > > what is the resistance between two point seperated by a
> > > knights move (i.e.
> > > up two, over one, or over two and up one.....etc...)
> >
> > If I'm not slipping up, the resulting equation would be:
> >
> > PI PI
> > / /
> > 1 | | 1 − cos(2u + v)
> > R = −−−−−− * | | −−−−−−−−−−−−−−−−−−−−−− du dv
> > 4*PI^2 | | 2 − cos(u) − cos(v)
> > / /
> > −PI −PI
> >
> > But thinking as a programmer, I'd probably just solve it numerically,
> > not through numerical or closed integration of the above, but instead
> > by:
> >
> > (a) create a matrix V[] to represent the node voltages
> > (b) select some central point for A, call it V[x,y]
> > (c) arbitrarily initialize the matrix node values
> > to 0.5

(d) initialize matrix element V[x,y] to 0.0.
(e) initialize matrix element V[x+2,y+1] to 1.0.
(f) divide the grid into a checkerboard arrangement
with white and black (or red and black) squares
(g) process all the black squares, those not V[x,y]
or V[x+2,y+1], so that their new value is the
mean of the surrounding four nodes.
(h) process all the white squares, those not V[x,y]
or V[x+2,y+1], so that their new value is the
mean of the surrounding four nodes.
(i) until satisfied, go back to (g).
(j) add up the four node voltages adjacent to V[x,y]
into 'sum'
(k) print 1/(sum−4*V[x,y]) as the resistance.

Which looking at the near center of a 80x80 grid (probably close enough) comes out to 0.7728 ohms.

As long as you're writing the program, how about a sort of chart, or graph, of the node−to−node resistance for a whole family of matrix sizes − 4 x 4, 9 x 9, 10 x 10, 100 x 100, and so on, and see if it approaches a limit − it might be interesting to see the difference between, say, 80 x 80 vs. say, 1000 x 1000.

Trivial to do, actually. It's just that the run time right now using interpreted basic is painful. I may get around to it. But I've posted my code, too, so anyone else can try a hack at it if they want to.

Jon
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