Email to Fabian “ryg” Giesen

25/1/13

Hi ryg,

I am reading through your half-edge series on your blog, and have found it very useful so far. Thank you for writing all of this up.

I notice that you haven't gotten round to writing up the extrusion or subdivision posts, but I was wondering whether you could just give a very brief outline (or some links) about these topics?

Cheers.
Cheng Sun

Email to Paul Falstad

7/3/13

Hi Paul Falstad,

I have been reading the source code for your Ripple tank simulation, and I was wondering whether you could briefly explain the mathematics / link me to an explanation of the mathematics of simulating such wave behaviour using a grid-based approximation?

Some more specific questions I had...

I see that the key code calculates a "basis" based on neighbours, and then calculates the new data point based on this and a scaling factor of sin theta and cos theta (what you call scaleo and sinth).
What are the mathematical principles behind this?
Why is there an imaginary component to each grid point and what does this represent?
What allows you to update each grid point in place, what trick is employed so that you don't need to write to a separate "new" grid which gets copied in at the end?
What does the comment that is in the code mean, when it says "rotating the point (func[gi], funci[gi]) an angle tadd about the point (basis, 0)"?
How do you accomplish the fact that waves don't get reflected off the edges of the simulation? My attempt at implementing your algorithm leads to very strong reflections at the edges no matter what kind of values I use to extrapolate just outside the simulation.

Thank you so much for taking the time to read this. It'd be much appreciated if you could resolve my queries.

Cheers,
Cheng