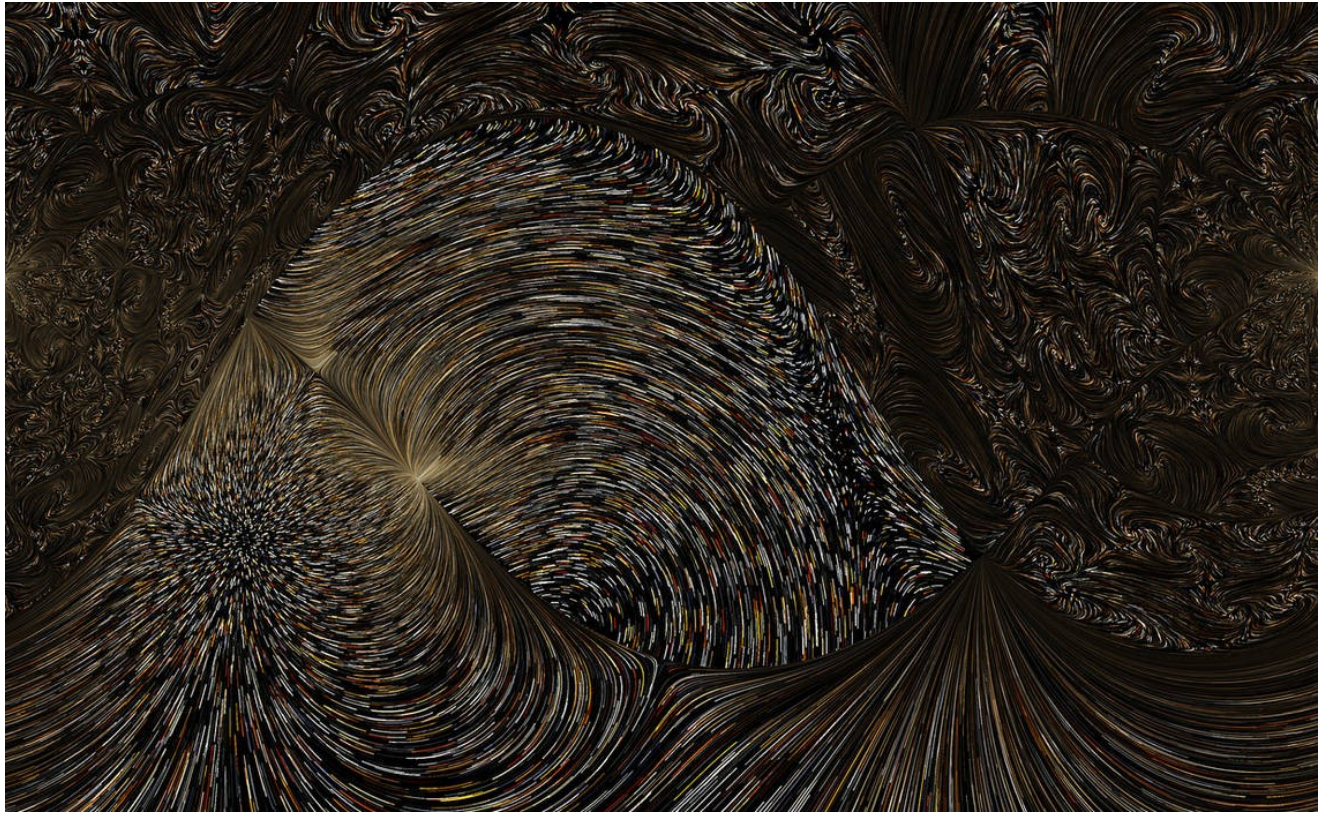


Multiple loops fractals

by tatasz

Lets talk a bit more about the multiple loops fractals mentioned in [Xaos Basics](#) Tutorial.

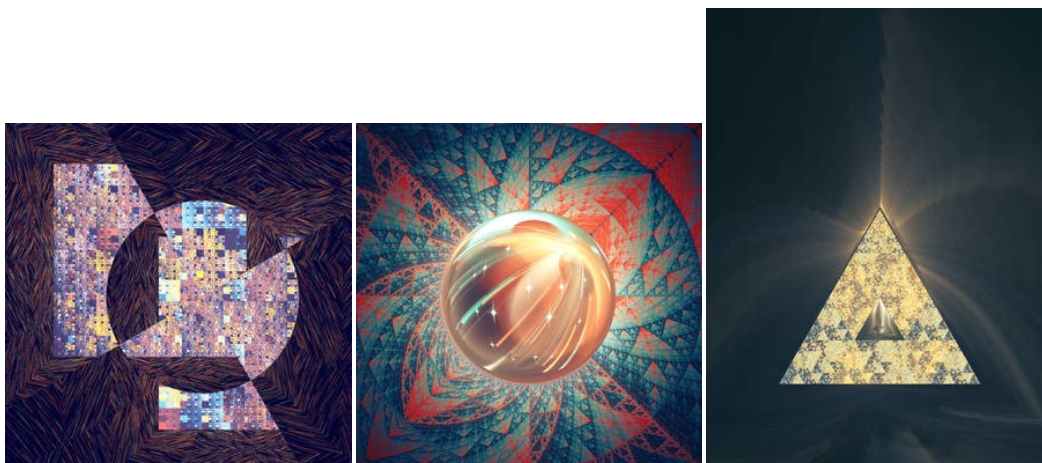
I learned this technique from [FarDareisMai](#), as she described it somewhere in comments or in [#aposhack](#). Unfortunately, the technique is extremely underused.



As the name suggest, multiple loop fractals feature multiple independant xaos loops, and are basically several different fractals put together without interacting. This technique is useful when you cannot use just one loop: for example, when you have a tile and something blurry, using a xaos loop for the tile and a xaos loop for the blurry part would allow to keep the tile clean.

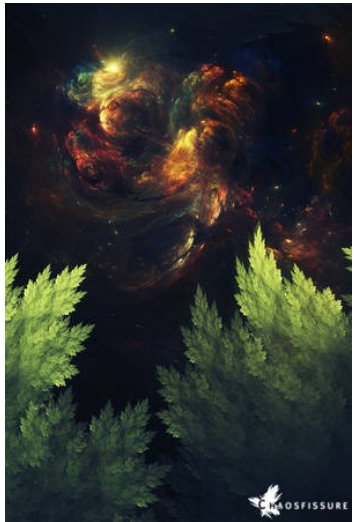
So, your fractal have elements A and B. You want them both visible, and also you don't want element A appear in B, and element B appear in A. Also, at least one of the elements has no blurry or messy transforms, so you cannot use those to hide the other element. This is when you use multiple loops

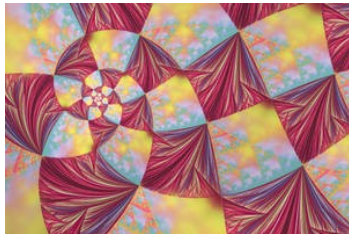
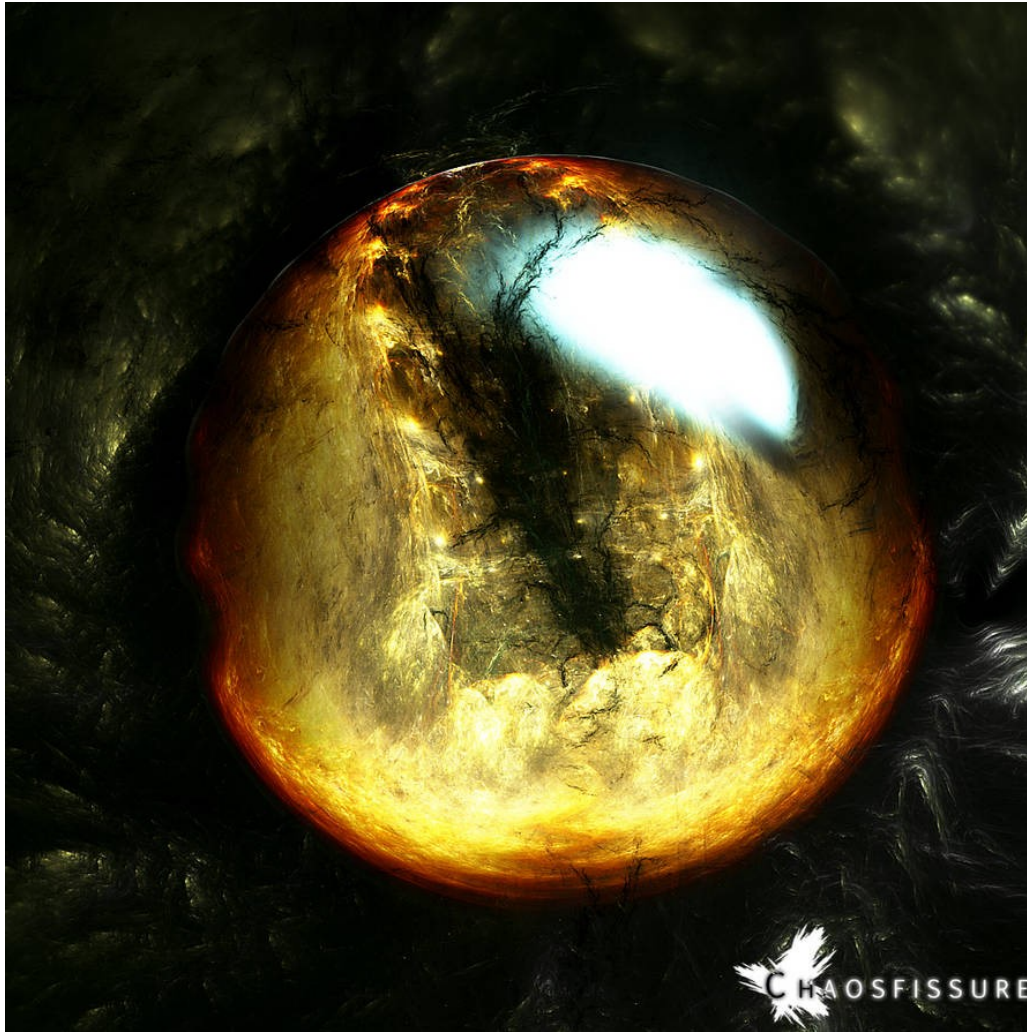
Below, from left to right, a glitch + linear tile and blurry bubble + linear tile (both 2nd and 3rd fractals):



For example, in the blurry bubble + linear tile structure, with single loop, the bubble would show in the tile, even if as something small/subtle/just dots. Now, if the tile had a blurry part, the multiple loops would not be needed. One could just link everything together like this: bubble -> (blurry part of the tile) and tile -> bubble.

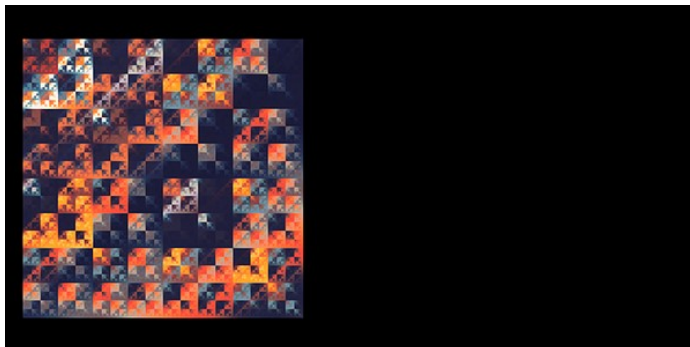
And, just an update, a few more examples:



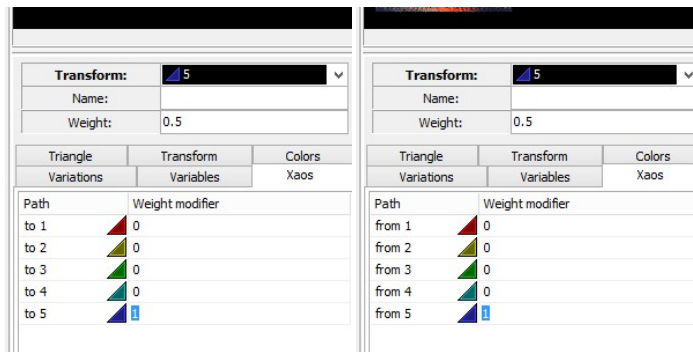


Basic Example

Start with a simple square linear tile (like this [Linear base](#)):

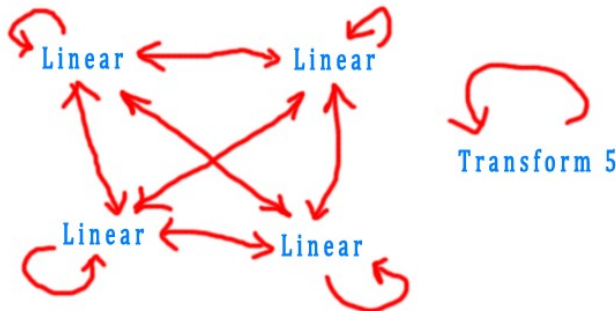


Now, add a new transform. On the `xaos` tab, set all weight modifiers (both to and from) for this transform to 0:

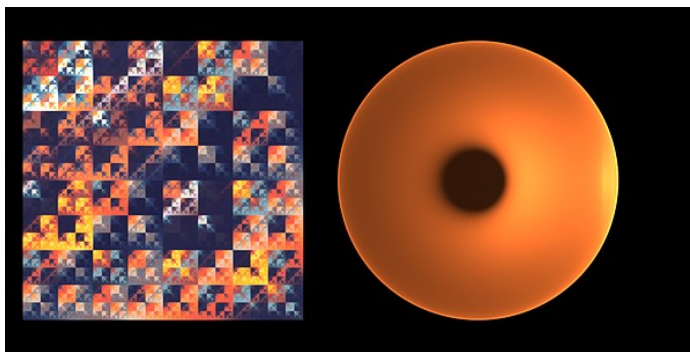


If you done everything correctly, your image should remain identical to what you had before adding transform 5. If your image is blank or got messed up, check out if you set the xaos values correctly.

Lets see what it looks like on the fluxogram: 2 loops 🤖



Now, remove linear from transform 5, and add bubble = 1 and pre_blur = 10. Move its post transform 2.25 to right: [simple 2 loops](#)
In Apophysis, you still should see only a square, but if you paste your parameters into Chaotica, you shall see something like:



We have both a linear tile and a blurry bubble, and there is no sign of the bubble in the linear tile.

Advanced example

As each loop is basically a single fractal, you may have troubles when adding cool blurs to the bubble, as it is the same as trying to add cool blur effects to a fractal that has ONLY the bubble. So the trick is to make some simple design - for example a few randomly placed linears - then put it into a bubble.

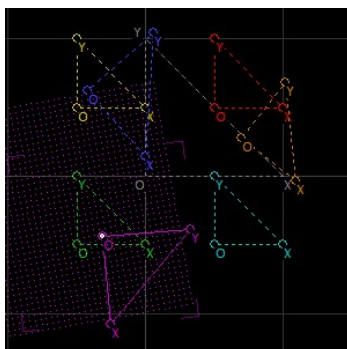
Go back to the linear tile, add a new transform and set the xaos as described in the example above: [multiple loops 1](#)

Now, duplicate transform 5 twice (so you have 5 transforms). Now, we have 2 closed loops, one with 4 linears making the square, and the other with 3 linears.

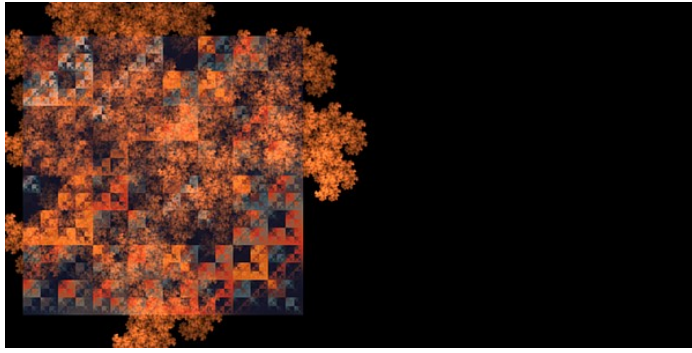
For transforms 5, 6 and 7, do the following:

- Scale down by 125% 1-3 times
- Rotate randomly
- Shift randomly

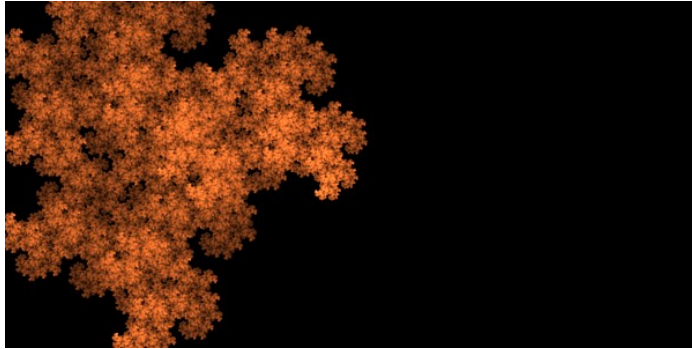
Something like this: [multiple loops 2](#)



In Apo, you should see the square unchanged. In Chaotica, you should see something like this:

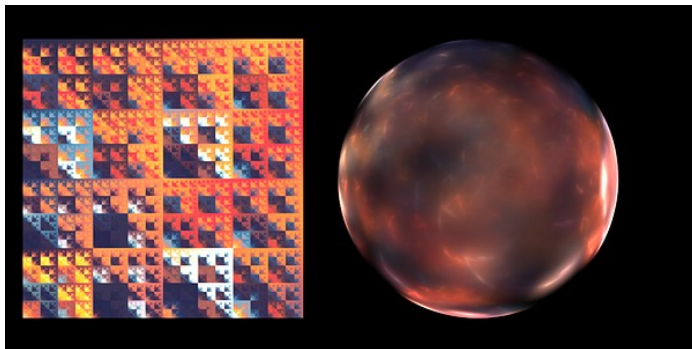


Or, if you set opacity = 0 for transforms 1 to 4, this:



Now, duplicate transform 5 once more, and, on transform tab, reset the transform. On this transform, transform 8, replace linear with bubble = 1 and pre_blur = 0.2. Move its post transform 2.25 to right. On transforms 5, 6 and 7, set opacity to 0.

I also hit randomize color for some extra color effects and changed the color speeds on transforms 5-8 for the same purpose. Your result should look like this (in Chaotica): [multiple loops 3](#)



With a bit more shapes to be blurred, cooler blur and lighting effects can be achieved.

A few tips

Adding a linked ngon with appropriate number of sides and power = 2 will transform the bubble into an inverted n-gon (ngon with power = 2 works similarly to spherical), so you can use the technique explained in [Xaos Basics](#) to fill the area outside linear tiles.

When adding glitches to multiple loop fractals, be careful: as glitches require a low stopping SL, the other loops must also look good at low stopping SL. For example, a glitch works well combined with a linear (as both render really fast and look good at SL 2 or so), but would most likely fail with a blurry bubble, because either the bubble will look noisy or the glitch would be smoothed out.

Finally, as you have several independant loops, they all must have a similar brightness, as it can get really tricky to make both look good if one is too bright, and the other, too dark.