21) A 4D Mystery

In this article we shall start with a short zoom in the b-plane (b_{real}, b_{imag}) when a = 0.7 + 0i (that is a_{real} is fixed to 0.7 and a_{imag} fixed to 0). The last zoom (b-zoom3) is the same motive as "The Dream of Jacob in Betel" on the cubic part of my website. In this image we capture the tip of the spike of the minibrot, marked with a yellow dot. This spot has the coordinate b = -0.118930830929279327 - 0.229212508190917969i (that is b_{real} = -0.118930830929279327 and b_{imag} = -0.229212508190917969). That is, the complete four- dimensional coordinate for this spot is:

*a_{real} = 0.7
*a_{imag} = 0
*b_{real} = -0.118930830929279327
*b_{imag} = -0.229212508190917969

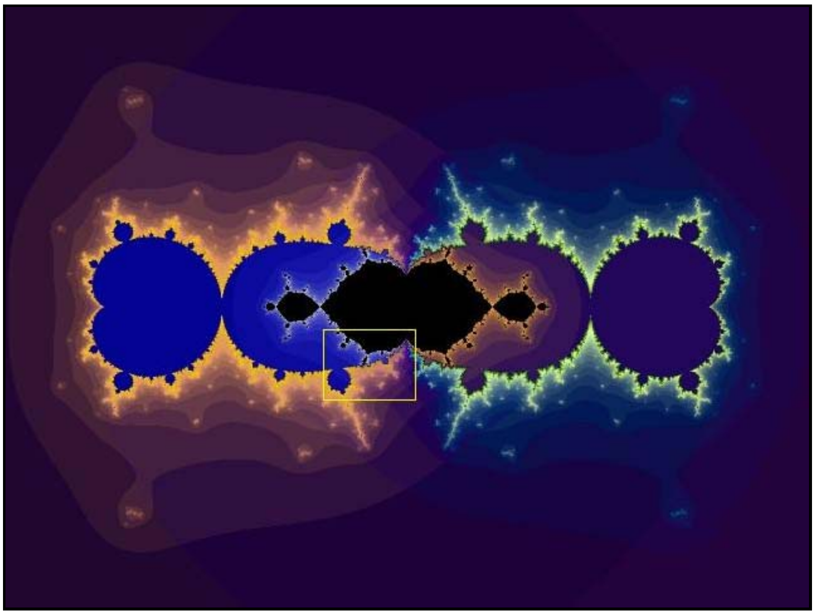

Fig 1. b-start.

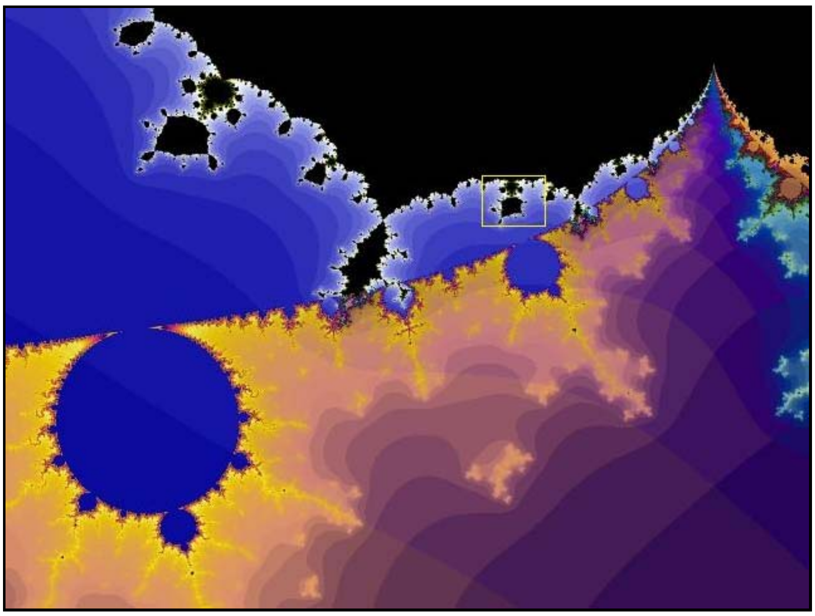

Fig 2. b-zoom 1.

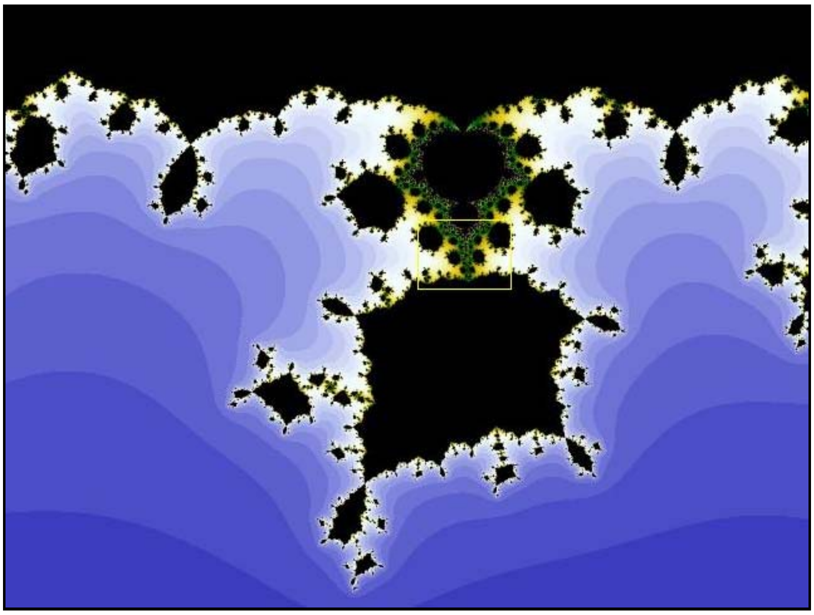

Fig 3. b-zoom 2.

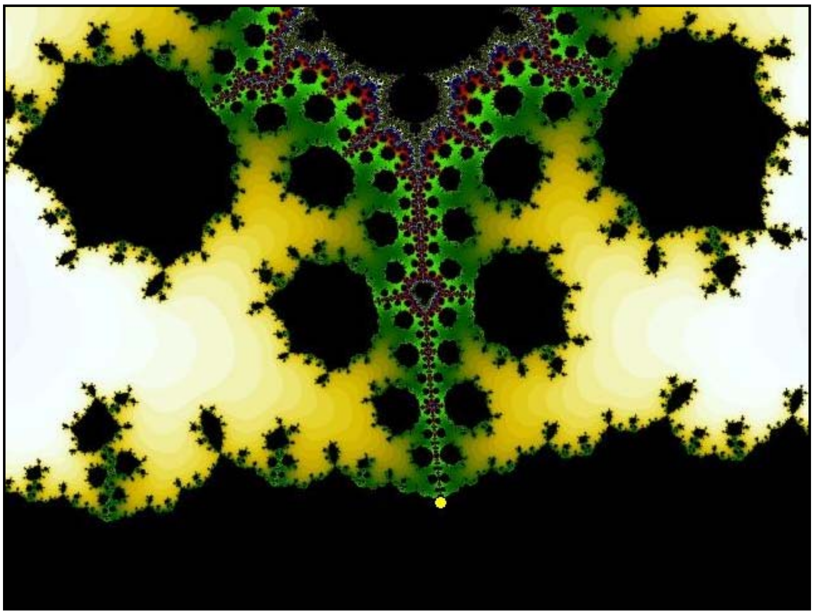

Fig 4. b-zoom 3.

Now arises an interesting question. If we fix this b-parameter and instead plot the a-plane, and then focus against the coordinate a = 0.7 + 0i we will see exactly the same spot. Which views would we obtain before and after zooming in?

Note: In 3D-space two planes, if they intersect, do so in a line. But in 4D-hyperspace two planes can only intersect in a single point (If they not are situated in the same 3D-slice)!!!

So let's first draw the a-plane when b is fixed to -0.118930830929279327 - 0.229212508190917969i and then zoom in against the spot a = 0.7 + 0i, the only spot of this plane that is common to the spot were the spike ends in b-zoom3. Thus:

1) First we obtain the image ”a-start”, a very quite different motive than ”b-start”.

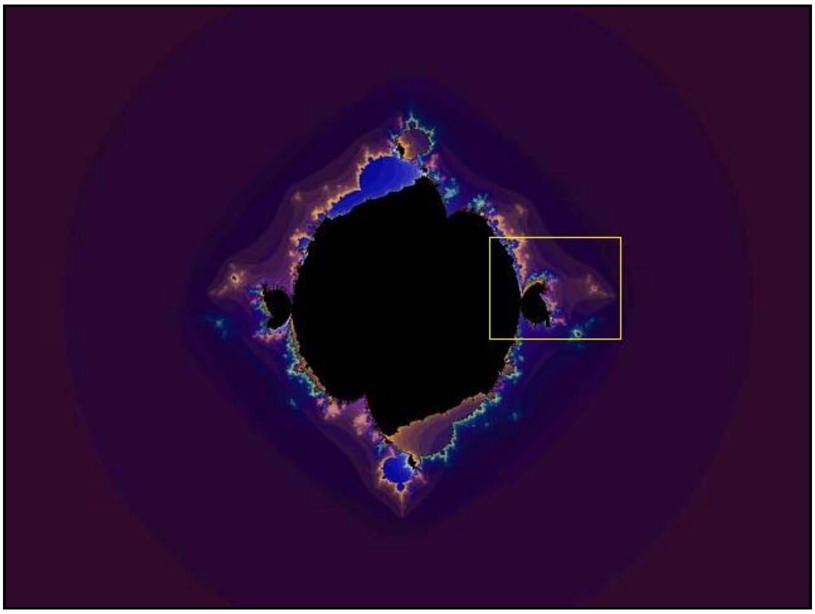

Fig 5. a-start.

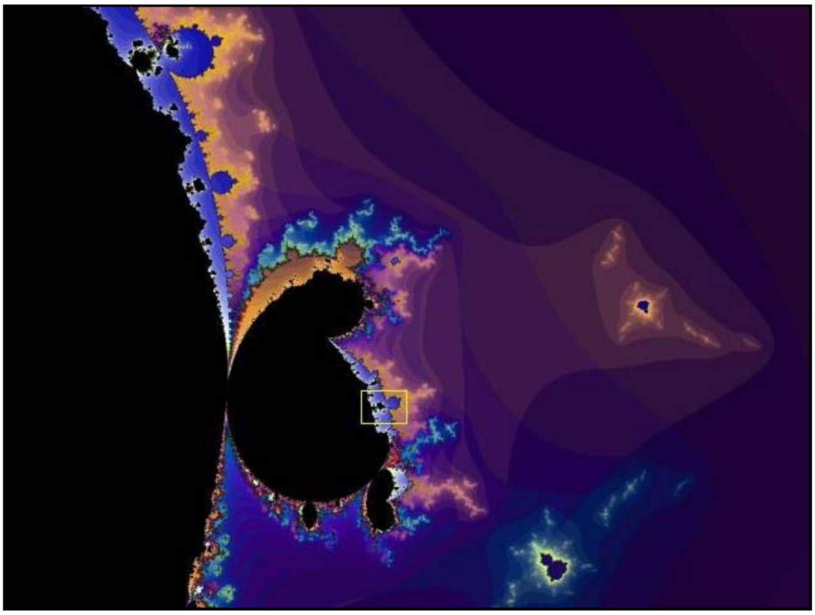

Fig 6. a-zoom 1.

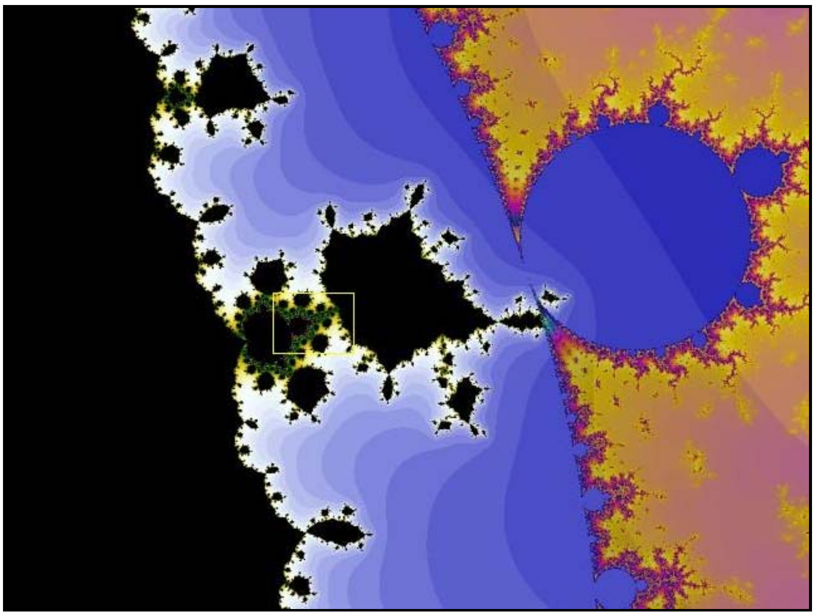

Fig 7. a-zoom 2.

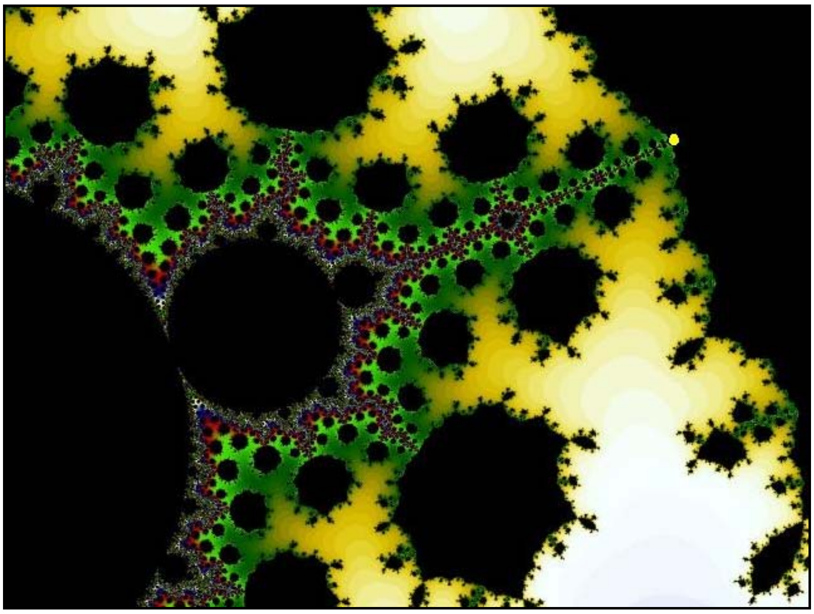

Fig 8. a-zoom 3.

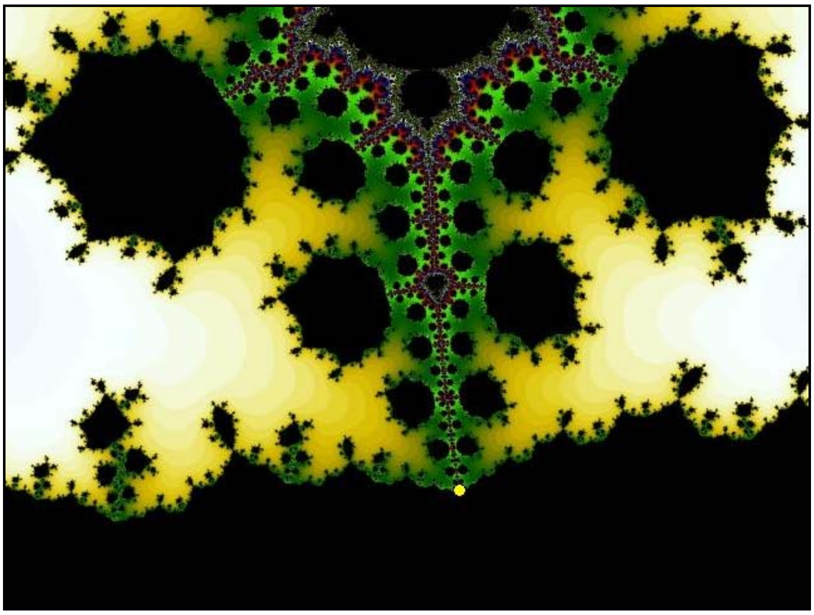

Fig 9. a-zoom 3 rotated.

2) Second we start to zoom in against the coordinate b = 0.7 + 0i (b_{real} = 0.7 and b_{imag} = 0).

3) Finally we come up with a-zoom3 and what! We land at a tip of a spike of a minibrot (also marked with a yellow dot) having the same environment as the tip of the spike in b-zoom3!

These two planes displayed in ”b-start” and ”a-start” in the four-dimensional hyper-space of cubic polynomials intersect in one single point, and in this single point spikes of two minibrots with almost identical environments end up although the parent fractals are quite different. Oh yeah, the last zoom (fig 8) have a different angle, but if you rotate this image about 110 degrees to the right and move and zoom in a little bit the motive will be quite similar to b-zoom 3. In the last image, fig 9, ”a-zoom 3 rotated” I've done so.

This is a very fascinating phenomenon that I've found a lot of examples on. This phenomenon seems almost to be there if you start in a 2D-slice that does not intersect origo. In the other four perpendiculars systems of slices (a_{real}, b_{real}), (a_{real}, b_{imag}), (a_{imag}, b_{real}), and (a_{imag}, b_{imag}), containing the above 4D-coordinate also minibrots end up with their spikes in a similar environment. However in these cases the motives are a little bit tilted. I leave to the dilligent reader to draw these slices. In the next article I will give another example on this phenomenon and also show up how to investigate this in UF.

Don’t forget my ”Cubic Tutorial” and ”Pictures from Cubic Parameterspace” reachable from my index page.

Regards
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