User Defined Feigenbaum Iteration*

Please see first: About The Feigenbaum Tree

The question "*How can one find periodic attractors of, say, a family of Newton Iterations?*" led to the development of this exhibit. The user can input an iteration function that depends on one parameter aa (which is, as in the Feigenbaum case, represented horizontally). The dynamical space consists of some interval of arguments y of the function. We can view them as starting values of the iteration. The default iteration in 3DXM is the Newton iteration for the zeros of the polynomial $y \to (y^2-3)^2+3aa$.

The Feigenbaum picture is ideally suited to watch how the aa-family of iterations behaves: One quickly spots attractive fixed points or attractive orbits with small period; but one also observes the density curves in a seemingly chaotic region. If one expands the scale, i.e. stretches a very small aa-interval over the whole screen, then one sees easily whether there are in this interval periodic attractors, or whether still only chaos is visible (then choose a different aa-interval or expand the current interval further).

The remaining details are the same as for the classical Feigenbaum Tree and are explained in detail in the documentation for that exhibit.

H.K.
