An Image Synthesizer

One of the most common challenges in the CGI field has been how to create a realistic and efficiency naturalistic textures. The solution that they have found is using a combination of stochastic function and they developed “Pixel Stream Editing” language to program such textures.

The language is based in high level programing languages and used some of their grammars, conditions and structures, but they used only vectors and scalars variables to produces the images.

What they propose is the development of functions in 3 dimensions that, instead of just “fit” the surface we want to “paint”, can give us the value in every position of the surface. And at the same time that function occupy an extremely small space in the database. Using this idea, we can simulate different kind of surfaces

In order to get the most of the PSE, they provide the most fundamentals stochastic functions:

* *Noise*: it is useful to create surface with stochastic features at different scales without losing the control over the basic geometrical operations. The author has developed different algorithms and they explain the simple one, although is it not the best. Using different formulas we can get different random textures.
* *DNoise:* provides a simply way to specify normal perturbation. Is the instantaneous rate of change of “Noise” along x, y and z.

With that functions we can developed others more complex such a turbulence one that allow us to create new textures like Marble, Fire or Water following different process or algorithms.

The PSE method can be used both to create new images and to combine or modify previous images. As for the efficiency of the method, it can be consider time efficient, space efficient (because we can use nonlinear functional composition to model the stochastic part of the structure) and flexible.

They are working in the improvement of the method, compiler, insertion of large data bases into the image and they have used it to draw other non-turbulence surfaces such us falling leaves, swaying trees…