

Week 2 Ongoing Research Document

Particle Systems.

Particle systems have their own libraries of manipulating and changing geometry and play an important role in creating projects in Touch Designer.

Derivative's library on Particle Systems:

<https://derivative.ca/UserGuide/Particle>

Tutorial on interactivity with particles:
By "Supermarket Sallad"

<https://www.youtube.com/watch?v=NuIShUTg3nI&t=78s>

Week 3 Ongoing Research Document

Feedback

Manipulating feedback can offer intense and interesting visuals in terms of looping the visuals back into their input.

Karl Sims describing Reaction Diffusion which can be accomplished via Feedback looping

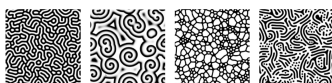
<https://www.karlsims.com/rd.html>

Beginner introduction to Feedback Interactivity
By "Okamirufu Visualizer"

<https://www.youtube.com/watch?v=a7KtirwLoyo>

Some typical values used, for those interested, are: $D_A=1.0$, $D_B=5$, $k=200$, $k=1000$ (if and k vary for different patterns), and $\Delta t=1.0$. The Laplacian is performed with a 3x3 convolution with center weight -9, adjacent neighbors 2, and diagonals 0.5. The grid is initialized with $x=1$, $y=0$, and a small area is seeded with B's.

Surprisingly complex and dynamic behaviors can arise from these fairly simple rules, and adjusting the two parameters for the feed rate and kill rate can produce a range of different results. The grid is visualized by assigning each cell a color from A and B values. Here A is white and B is black.



The reaction naturally has two stable states: lots of A with no B to consume it, or lots of B where new A is quickly converted into more B. But the diffusion can cause interesting behaviors at the borders between the regions A and mostly B areas. In this "bistable" situation, all corners borders of B slowly move A further is possible nearby to diffuse results and feed B, so those edges grow outward as B increases and diffuses. But at corners borders, less A diffuses in and B slowly thins out and dies off. This can cause a spot of B to grow and then divide into two as it forms a cell undergoing mitosis.

