

Simple “Yes/No” Decisions Modeled by the Cusp Catastrophe

Of the seven elementary catastrophes I think the “cusp” model best describes simple “yes/no” decision making. Of course, it models many other real world bimodal behaviors like fight or flight, hysteresis, waking/sleeping, the clicker, boiling/condensation, etc.

The Cusp model is represented by the following sheet surface: a curved surface with a pleat.

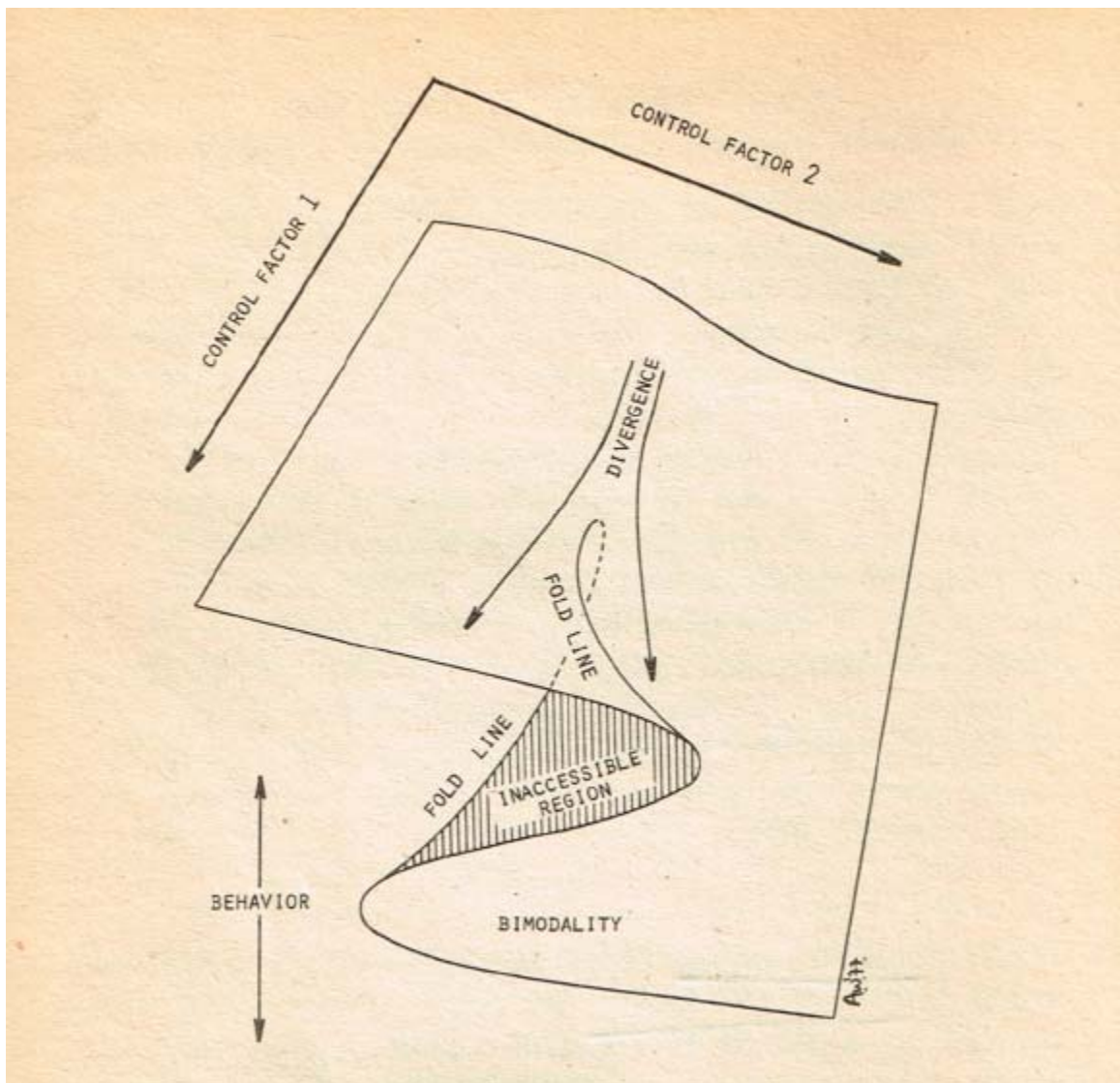


Figure 1: The Cusp Catastrophe

It has two control factors and the stable surface is bimodal. A point can travel along this surface in a smooth, continuously varying manner until the control factors cause it to jump from one stable state to another.

The interesting thing is that, for certain combinations of control factor values, there are two possible stable states! No wonder we have such a hard time making decisions, or we jump back and forth!