

# Douglas Hofstadter - Gödel, Escher, Bach: An Eternal Golden Braid - 1979

Tom Rochette <tom.rochette@coreteks.org>

November 2, 2024 — 36c8eb68

## 0.1 Context

## 0.2 Learned in this study

## 0.3 Things to explore

- Playing with axioms validity creates new realities (GEB)

## 1 Overview

## 2 Notes

- (p335) It is a visible consequence of the overall system organization - an “epiphenomenon” (certain things are not stored anywhere, but is the result of the interaction of many factors)
  - In the human brain, there is gullibility. Is gullibility located in some “gullibility center” in the brain?
- (p362) Thought must depend on representing reality in the hardware of the brain
- (p365) It is almost certainly false that there is a fixed group of neurons for each different concept
- (p368) Memories might be coded locally, but over and over again in different areas of the cortex. Another explanation would be that memories can be reconstructed from dynamic processes spread over the whole brain, but can be triggered from local spots.
- (p368) Retinal neurons are primarily contrast sensors. Each retinal neuron is normally firing at a “cruising speed”. When its portion of the retina is struck by light, it may either fire faster or slow down and even stop firing.
- (p369) The cells of the visual cortex are divided into three categories:
  - **Simple cells:** Similar to retinal cells or lateral geniculate cells: they respond to point-like light or dark spots with contrasting surrounds in particular regions of the retina
  - **Complex cells:** Receive input from a hundred or more other cells and detect light or dark bars oriented at specific angles on the retina
  - **Hyper-complex cells:** Respond to corners, bars, or even “tongues” moving in specific directions
- (p372) Neural complex: a small group of neurons
- (p373) We want to shift the description of the brain state from the signal level to the symbol level
- (p380) Perhaps several symbols can coexist in the same set of neurons by having different characteristic neural firing patterns
- (p407) Consciousness is that property of a system that arises whenever there exist symbols in the system which obey triggering patterns
- (p411) Turing suggests that above a certain level of complexity a qualitative difference appears, so that “super-critical” machines will be quite unlike the simple ones hitherto envisaged
- (p417) One can ask a question and try to solve it a certain way, only to search for the solution forever, while formulating it another way would guarantee the search to terminate

- One can compress a concept using other concepts (29 is prime is the same as saying that it cannot be decomposed into other previous primes)

### **3 See also**

### **4 References**

- Hofstadter, Douglas R. Gödel, Escher, Bach: An Eternal Golden Braid. New York: Basic Books, 1979.