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CYCLES

Complex networks used to mimic living beings with nonliving artifacts are frequently subjected to anomalous procedures that result from undesirable and undetected network of closed circuits, named cycles, CYC.

**(a) Complex Systems.**

Complex systems are an intricate network of sub-systems with specialized functions, called operators, O_, which are members of an universal set of operators, U.

The subset, UO, of U, used to build the system has a much smaller cardinal then that of the Cartesian product, UxU.

**(b) Arcs**

An arc, Ajk, is an unidirectional connection of an oriented pair of operators, (Oj,Ok).

Arcs function is the transportation of mass, energy and forma (information) converting the universal set, UO , in a network.

Arcs can be programmed to vary the fluxes and even the design of the function.

In general, Oj and Ok are created and developed by different specialists and the arc, Ajk, is a joint task.

The task does not include cycles control and cycles may occur .

**(c) Cycles.**

A cycle is a succession of arcs starting and finishing with the same operator .

e.g.: (Og , Od) (Od , Ok) , ..., (On , Om) , (Om , Og).

The frequency of a cycle rotation may diverge and the system operation may be impaired.

**(d) Catastrophes**

The carrying capacity of cycles may be rather negligible and cycles may not reveal their existence.

Simultaneous malfunctions of many arcs are quite rare, never the less *cycles* members of the dangerous specie of *Dêmoklês spades.*

**(e) Cycles Levels**

The number of participating arcs is the cycle level .

Level 1 is the minimum level and is (Oh , Oh).

**(f) Typical Universal Sets**

| | | | |
|---|---|---|---|
| Cardinal of U | 200 | 100 | 30 |
| Cardinal of UA | 90 | 20 | 10 |
| Occupancy UA/U | 0.45 | 0.20 | 0.33 |
| Cycle Level = 4 | | | |
| Cardinal (A) | 20 | 40 | 90 |
| Maxima Tests | 1.6 (4) | 2.56 (4) | 6,56 (5) |
| Cycles Detected Typical Ranges | 0..16 | 0..25 | 0..6 |
| Cycle Level = 6 | | | |
| Cardinal (A) | 20 | 40 | 90 |
| Maxima Tests | 6.4 (7) | 4.096 (9) | 5.31441 (11) |
| Cycles Detected Typical Ranges | 0..4 | 0..6 | 0..1 |

**(g) Program**

A program in Pascal was created to test the existence of cycles in a given system.

Some runs where made and , as expected, the number of trials grows immensely with both cycles level and cardinal(AU)

| Level | Trials |
|---|---|
| 1 | 1.56 +02 |
| 2 | 2.43 +04 |
| 3 | 3.79 +06 |
| 4 | 5.92 +08 |
| 5 | 9.23 +10 |
| 6 | 1.44 +13 |
| 7 | 2.24 +15 |
| 8 | 3.50 +17 |
| 9 | 5.47 +19 |
| 10 | 8.53 +21 |

**Note**

Faulty Circuits by Thomas R. Insel.
(Scientific American , April , 2010, page 28.)
is a splendid presentation namely of the connection bet twin psychological disorders and imperfect networks.

It is my believe that some disorders are caused by dormant cycles that start to be active.

To test this conjecture meant the construction of a program to detect cycles in a given network that could process universal sets, U, with cardinals in the range of 100000 to a million.

My computer took hours to produce de information above referred fed with a network with U=100 and level 10 !