Genes and Memes

1. Genetic code:

   (a) DNA and RNA codons represent 6 bits giving $2^6 = 64$ different codons. There are 20 aminoacids.

   (b) DNA codons are mapped to 20 aminoacids and and there are 3 stop ping codons stopping the translation. Stopping could be formally regarded as aminoacid.

   (c) Given aminoacid A is coded bby certain number n(A) of DNA codons.

   (d) Question: Are these numbers completely accidental as the belief in random mutations as driver of evolution would suggest or are there some deeper reasons for why they are just what they are?

   (e) TGD has inspired several proposals in attempts to answer the question. The first class of trials are mathematics based and second class physics based.

2. Combinatorial Hierarchy (CH) was the first attempt to answer the question and was inspired by number theory.

   (a) Hilbert conjectured that that there might be an infite hierarchy of Mersenne primes $M_n = 2^n - 1$, n some prime (not any prime), constructible by an iterative process.

   (b) The formula would be $M(n) = 2^{M(n-1)} - 1$, $M(1) = 2$. The first Mersenne primes would be $3, 7, 127, 2^{127} - 1$. After this the computational power of recent computers is not enough check whether next candidate is prime.

   (c) These Mersennes might relate to a hierarchy of Boolean algebras (B). The lowest B would contain 3 statements and obtained from Boolean algebra with 4 statements (2 bits) by throwing out one to get 3 statements.

   (a) The thrown out statement could correspond to empty set in the set theoretic realization of Boolean algebra. Analogous interpretation can be found in other realizations such as realization in terms of fermionic Fock states.

   (b) Half of the statements of Boolean algebra can be true simultataneously as analogs of axioms of a mathematical system. Now the number would be 2. For n-bit Boolean algebra it is 2^{n-1}.

   (c) One can form statements about all statements of nelement Boolean algebra: this gives 2^n statements: this corresponds kind of reflective level of Boolean consciousness. This gives $2^n - 1$ realizable statements and 2^{n-1} statements, which can be true simultaneously.

   (d) Question: Could CH represent an infinite hierarchy of reflective levels of Boolean consciousness with number of statements with Mersenne prime giving the number of realizable statements?

3. How could this relate to genetic and memetic codes?

   (a) The next code call it memetic code would contain 2^{126} codons realizable as sequences of 21 DNA codons.

   (b) For $M(4) = 127$ realizable statements and $2^6 = 64$ statements, which can be true simultaneously. Could DNA codons re presentthese 64 state ments?

   (c) One can also try to understand the emergence of number 21 of ami- no-acids with stopping sign counted as "aminoacid". Number $M(4) - 1 = 126 = 6 \times 21$ is divisible by 21 and by the number 6 of independent bits of genetic codon. Is this a mere co-incidence or something deeper?

   (d) This observation holds true also a the next level. The number of of bits is 126 and divides the number $2^{127} - 2$. Number $N = (2^{127} - 1)/63$ would give the number of memetic "aminoacids".