Refutation of a fast algorithm for network forecasting time series from definition of visibility graph

Abstract: We evaluate a definition of the visibility graph as *not* tautologous to deny a fast algorithm for forecasting time series. Hence the conjecture of a forecasting algorithm is denied. This forms a *non* tautologous fragment of the universal logic VŁ4. However, we resuscitate the conjecture using the Kanban cell neuron network (KCNN), a linear step-wise function, for the desired conjecture without injected data.

We assume the method and apparatus of Meth8/VŁ4 with Tautology as the designated proof value, **F** as contradiction, N as truthity (non-contingency), and C as falsity (contingency). The 16-valued truth table is row-major and horizontal, or repeating fragments of 128-tables, sometimes with table counts, for more variables. (See ersatz-systems.com.)

LET ~ Not, ¬ ; + Or, ∨, ∪, ⊔ ; - Not Or; & And, ∧, ∩, ⊓, ·; \ Not And;
> Imply, greater than, →, ⇒, ↦, ≻, ⊃, ↠ ; < Not Imply, less than, ∈, ≺, ⊂, ⊬, ⊭, ↞, ≲ ;
= Equivalent, ≡, :=, ⇐⇒, ↔, ≜, ≈, ≃ ; @ Not Equivalent, ≠;
% possibility, for one or some, ∃, ◊, M; # necessity, for every or all, ∀, □, L;
(z=z) T as tautology, ⊤, ordinal 3; (z@z) **F** as contradiction, Ø, Null, ⊥ , zero;
(%z>#z) N as non-contingency, Δ, ordinal 1; (%z<#z) C as contingency, ∇, ordinal 2;
~(y < x) (x ≤ y), (x ⊆ y); (A=B) (A~B); (B>A) (A⊢B); (B>A) (A⊨B).
Note for clarity, we usually distribute quantifiers onto each designated variable.

From: Liu, F.; Deng, Y. (2019). A fast algorithm for network forecasting time series. vixra.org/pdf/1905.0080v1.pdf liufanuestc@gmail.com, dengentropy@uestc.edu.cn

Definition 2 Connectivity in time series is defined as follows [27].

Remark Def. 2: The definition as the basis of the titled conjecture for a fast algorithm is derived from the footnote source below.

[27] Lacasa, L. et al. (2008). From time series to complex networks: the visibility graph. Proceedings of the National Academy of Sciences of the United States of America. 105. 13:4972–5. pnas.org/content/pnas/105/13/4972.full.pdf lucas@dmae.upm.es

More formally, we can establish the following visibility criteria: two arbitrary data values (t_a, y_a) and (t_b, y_b) will have visibility, and consequently will become two connected nodes of the associated graph, if any other data (t_c, y_c) placed between them fulfills: $y_c < y_b + (y_a - y_b)((t_b - t_c)/(t_b - t_a))$. (1.1)

LET p, q, r, t, y: *a* , *b* , *c* , *t* , *y* .

((((t&p)&(y&p))<((t&r)&(y&r)))<((t&q)&(y&q))) >
((t&r)<((t&q)+(((y&p)-(y&q))&(((t&q)-(t&r))\((t&q)-(t&p)))))) ;
TTTT TTTT TTTT TTTT(1),
T**F**TT TTTT T**F**TT TTTT(1) (1.2)

Eq. 1.2 as rendered is *not* tautologous. This means the original definition in Eq. 1.1, from which Definition 2 is derived, is refuted. Hence the conjecture of a forecasting algorithm is denied. However, we resuscitate Eq. 1.2 using the Kanban cell neuron network (KCNN), a linear step-wise function, for the desired conjecture without resorting to any other injected data between extrema: (((t&p)&(y&p))<((t&q)&(y&q)))> ((y&q)+(((y&p)-(y&q))\((t&q)-(t&p)))). TTTT TTTT TTTT TTTT (1.3)