Refutation of the EF-axiom

The EF-axiom describes the Efremovifč proximity δ by V.A. Efremovič from 1934 and published in Russian in 1951.

From: en.wikipedia.org/wiki/Near_sets#Visualization_of_EF-axiom

> "Let the set X be represented by the points inside [a] rectangular region ... . Also, let A, B be any two non-intersection subsets (i.e. subsets spatially far from each other) in X ... . Let C^c = X\C (complement of the set C). Then from the EF-axiom ... :
>
> A $\underline{\delta}$ B, B $\subset$C, D = C^c, X = D $\cup$C, A $\subset$D, hence, we can write
> A $\underline{\delta}$ B $\Rightarrow$A $\underline{\delta}$ C and B $\underline{\delta}$ D, for some C, D in X so that C $\cup$D = X." (1.1.1)

We interpret the operator $\underline{\delta}$ to mean "nearby" or "in proximity", but could just as easily mean "distant" or "far apart". The size of an antecedent or consequent is not stated for the operator, so we determine that the operator applies to unrelated literals. Therefore, we evaluate A $\underline{\delta}$ B as ((A$\in$B) Nor (B$\in$A)).

We assume the apparatus and method of Meth8/VŁ4 with the designated *proof* value of `T` for tautology, `F` contradiction, `C` falsity, and `N` truth. The proof result is for 16-tables of 16-values as row-major and horizontally. There are 256-values because four theorems are evaluated as the capitalized variables.

> ~ Not; + Or; - Not Or; & And; \ Not And; = Equivalent to; @ Not Equivalent to;
> > Imply, greater than; < Not Imply, less than, $\in$;
> # necessity, for all; % possibility, for one or some.
>
> LET: A B C D A B C D; A $\underline{\delta}$ B = ((A<B)-(B<A)); D = ((D+C)\C); X = D+C.
>
> (((((A<B)-(B<A))&(((B<C)&(D=((D+C)\C)))&((D+C)&(A<D))))>
> ((%C<(D+C))&(%D<(D+C)))) > ((C+D)=(D+C))) >
> (((A<B)-(B<A))>(((A<C)-(C<A))&((B<D)-(D<B)))) ; (1.2.1)

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TTTT TNTN TTCC TNCF . NTNT TNTN NTFC TNCF . CCTT CFTN TTCC TNCF . FCNT CFTN NTFC TNCF
NTNT TNTN NTFC TNCF . NTNT TTTT NTFC TTCC . FCNT CFTN NTFC TNCF . FCNT CCTT NTFC TTCC
CCTT CFTN TTCC TNCF . FCNT CFTN NTFC TNCF . CCTT CFTN TTTT TNTN . FCNT CFTN NTNT TNTN
FCNT CFTN NTFC TNCF . FCNT CCTT NTFC TTCC . FCNT CFTN NTNT TNTN . FCNT CCTT NTNT TTTT
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Eq. 1.2.1 as rendered is *not* tautologous.

We conclude the EF-axiom is suspicious as the theoretical basis for proximity space and for topology in fuzzy, near, and rough sets.