Erratum: Contextuality and noncontextuality measures and generalized Bell inequalities for cyclic systems [Phys. Rev. A 101, 042119 (2020)]

Ehtibar N. Dzhafarov,[1,*] Janne V. Kujala,[2,†] and Víctor H. Cervantes[1,‡]
[1] *Purdue University, USA*
[2] *University of Turku, Finland*

Having established that two measures of contextuality, CNT_1 and CNT_2, coincide for any cyclic system, in the last section of the paper we attempted to show by a counterexample that

$\mathfrak{S}$**:** for non-cyclic systems, CNT_1 and CNT_2 do not generally coincide, nor is one of them any function of the other.

As it turns out, this statement is correct, but the counterexample we chose was flawed due to a mistake in programing (see Fig. 1).

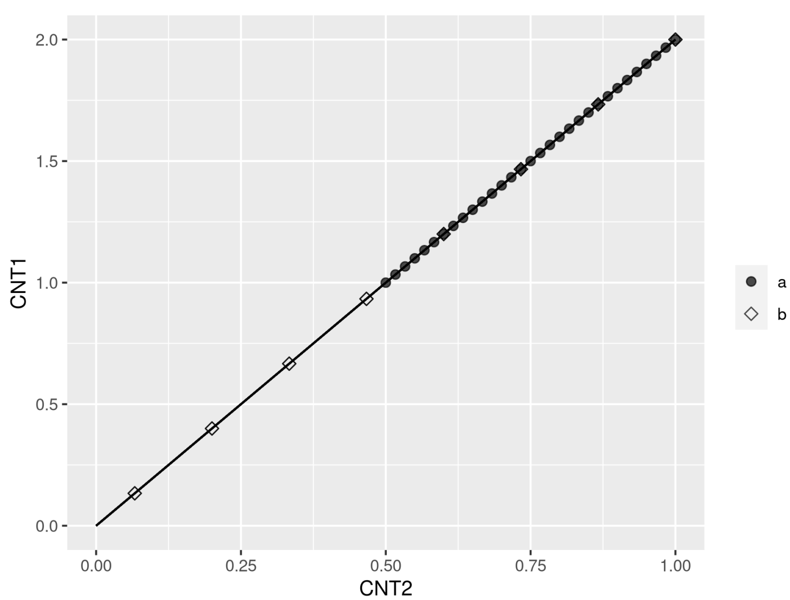

Figure 1. A corrected version of Fig. 16 for system (66) in the paper, with the same meaning of the symbols. Although CNT_1 and CNT_2 do not coincide, they are linearly related.

* Corresponding author: ehtibar@purdue.edu
† jvk@iki.fi
‡ cervantv@purdue.edu

Here is a correct demonstration of $\mathfrak{S}$. Consider the following system of dichotomous (0/1) uniformly distributed random variables,

$$\begin{array}{|c|c|c|c||c}
\hline
R_1^1 & R_2^1 & & & c_1 \\
\hline
 & R_2^2 & R_3^2 & & c_2 \\
\hline
 & & R_3^3 & R_4^3 & c_3 \\
\hline
R_1^4 & & & R_4^4 & c_4 \\
\hline
R_1^5 & R_2^5 & R_3^5 & R_4^5 & c_5 \\
\hline\hline
q_1 & q_2 & q_3 & q_4 &
\end{array} . \tag{1}$$

Assuming the variables in each of the first four rows are perfectly correlated, compute CNT_1 and CNT_2 for various joint distributions of the four variables in context c_5. The results in Fig. 2 show that statement $\mathfrak{S}$ is true.

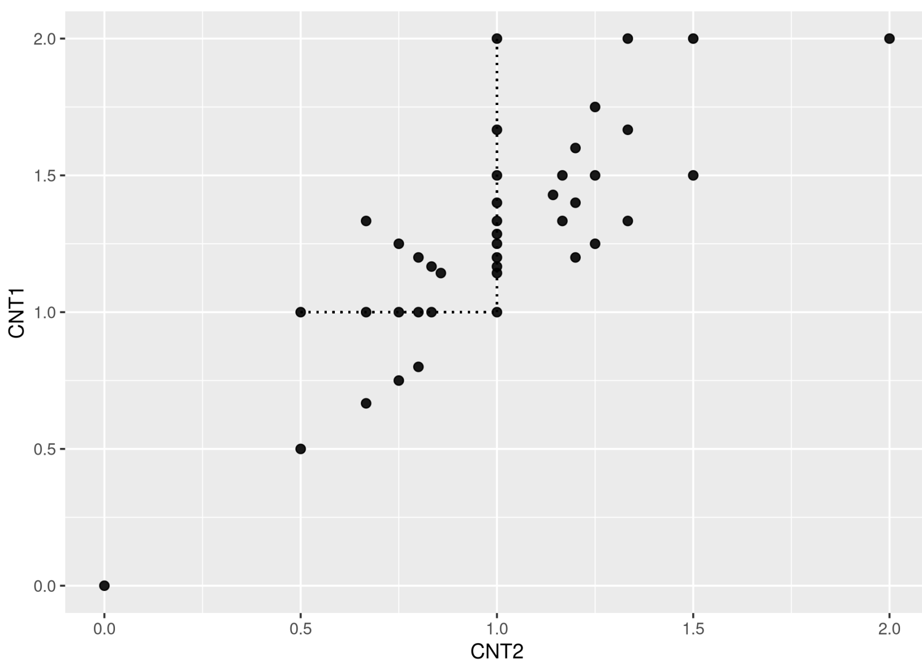

Figure 2. CNT_1 vs CNT_2 for system (1), with $\Pr\left[R_j^i = 1\right] = 1/2$ for all i, j in the system. Each symbol corresponds to a specific choice of the joint distribution of $R_1^5, R_2^5, R_3^5, R_4^5$, while keeping $R_1^1 = R_2^1$, $R_2^2 = R_3^2$, $R_3^3 = R_4^3$, and $R_4^4 = R_1^4$. Neither of CNT_1 and CNT_2 is a function of the other, as indicated by the horizontally and vertically aligned points.

The flawed counterexample was only used to demonstrate $\mathfrak{S}$, so nothing else in the paper is affected.