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Invariant fuzzy implications

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Due to a processing error, the presentation of Fig. 5 was incorrect. The correct Fig. 5 is given on the next page.

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$$\begin{aligned}
I_1(x, y) &= \begin{cases} 1, (x < 1) \vee (y > 0) \\ 0, otherwise \end{cases}, & I_2(x, y) &= \begin{cases} 1, x < 1 \\ y, otherwise \end{cases}, \\
I_3(x, y) &= \begin{cases} 1, (x = 0) \vee (y > 0) \\ 0, otherwise \end{cases}, & I_4(x, y) &= \begin{cases} 1, (x < 1) \vee (y = 1) \\ 0, otherwise \end{cases}, \\
I_5(x, y) &= \begin{cases} 1, (x < 1) \wedge (y > 0) \vee (x = 0) \\ y, x = 1 \\ 0, otherwise \end{cases}, & I_6(x, y) &= \begin{cases} 1, (x < 1) \wedge (y > 0) \vee (x = 0) \vee (y = 1) \\ 0, otherwise \end{cases}, \\
I_7(x, y) &= \begin{cases} 1, x \leq y \\ y, otherwise \end{cases}, & I_8(x, y) &= \begin{cases} 1, x \leq y \\ y, y < x < 1 \\ 0, otherwise \end{cases}, \\
I_9(x, y) &= \begin{cases} 1, (x < y) \vee (x = 0) \\ y, otherwise \end{cases}, & I_{10}(x, y) &= \begin{cases} 1, x \leq y \\ 0, otherwise \end{cases}, \\
I_{11}(x, y) &= \begin{cases} 1, (x < y) \vee (x = 0) \vee (y = 1) \\ y, (y \leq x) \wedge (0 < x < 1) \\ 0, otherwise \end{cases}, & I_{12}(x, y) &= \begin{cases} 1, x = 0 \\ y, otherwise \end{cases}, \\
I_{13}(x, y) &= \begin{cases} 1, (x < y) \vee (x = 0) \\ y, (x = y) \wedge (x > 0) \\ 0, otherwise \end{cases}, & I_{14}(x, y) &= \begin{cases} 1, (x = 0) \vee (y = 1) \\ y, 0 < x < 1 \\ 0, otherwise \end{cases}, \\
I_{15}(x, y) &= \begin{cases} 1, (x < y) \vee (x = 0) \vee (y = 1) \\ 0, otherwise \end{cases}, & I_{16}(x, y) &= \begin{cases} 1, x = 0 \\ y, 0 < x \leq y \\ 0, otherwise \end{cases}, \\
I_{17}(x, y) &= \begin{cases} 1, (x = 0) \vee (y = 1) \\ y, 0 < x < y < 1 \\ 0, otherwise \end{cases}, & I_{18}(x, y) &= \begin{cases} 1, (x = 0) \vee (y = 1) \\ 0, otherwise \end{cases}
\end{aligned}$$

for $x, y \in [0, 1]$.

Fig. 5 Invariant fuzzy implications I_1 – I_{18}