Refutation of Leibnitz’ indiscernibility of identicals and identity of indiscernibles as equivalent

Abstract: We evaluate Leibnitz’ law(s) of indiscernibility of identicals and identity of indiscernibles which are not equivalents, and the latter is not tautologous. The contradicts Leibnitz’ law of identity of indiscernibles. We also note that second-order expressions are expressible as first-order expressions because of the equivalence of respective quantifiers and modal operators in VŁ4. The results form a non tautologous fragment of the universal logic VŁ4.

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, 3, 0, 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, ∆, ordinal 1;   (%z<#z) C as contingency, ⊼, ordinal 2;  
~( y < x) ( x ≤ y), ( x ∈ y), ( x ⊆ y);   (A=B) (A~B).  
Note for clarity, we usually distribute quantifiers onto each designated variable.

From: en.wikipedia.org/wiki/Identity_of_indiscernibles

There are two principles here that must be distinguished (equivalent versions of each are given in the language of the predicate calculus).[1] Note that these are all second-order expressions. Neither of these principles can be expressed in first-order logic (are nonfirstorderizable).

1. The indiscernibility of identicals
   - For any x and y, if x is identical to y, then x and y have all the same properties.
     ∀x ∀y [x = y → ∀F(Fx ↔ Fy)]

2. The identity of indiscernibles
   - For any x and y, if x and y have all the same properties, then x is identical to y.
     ∀x ∀y [∀F(Fx ↔ Fy) → x = y]

We number Eq. 1 as (1.1) and Eq. 2 as (2.1).

LET  p, q, r: F, x, y.

(#q=#r)>((#p&)#q)=(#p&r)) ; TTTT TTTT TTTT TTTT (1.2)

(((#p&)#q)=(#p&r))>(#q=#r) ; TTCT TTCT TTCT TTCT (2.2)

Eqs. 1.2 and 2.2 as rendered are not equivalents, and Eq. 2.2 is not tautologous. The contradicts Leibnitz’ law of identity of indiscernibles. We also note that second-order expressions are expressible as first-order expressions because of the equivalence of respective quantifiers and modal operators in VŁ4.