A NOTE ON MACHIAVELLIAN STATEMENT

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ABSTRACT*: In this paper, we introduce a novel logical connective called "justifies." We also explore some of its fundamental properties. When two statements, denoted as p and q, are combined using the connective "justifies," the resulting composite statement "p justifies q" is referred to as a "Machiavellian statement." Specifically, in this context, p represents the means, and q represents the ends. A Machiavellian statement is precisely true when the means (p) is false and the ends (q) are true.*

Keywords: statement, logical connective, Machiavellian statement, Machiavellian logic

1. INTRODUCTION

A statement is a declarative sentence that can be either true or false [3], but not both. The truthfulness or falsity of a statement is known as its truth value. Statements can be combined using logical connectives (e.g., "and", "or", "implies") to create new statements called composite statements.

When two statements are joined by the connective "and", the resulting composite statement is known as a *conjunction*. A conjunction is true only if both component statements are true. When joined by the connective "or", the composite statement is called a *disjunction*, which is true if at least one of the component statements is true. A composite statement formed with the connective "implies" is called a *conditional* statement, which is false only when the antecedent is true and the consequent is false. Finally, when two statements are joined with the connective "if and only if", the result is a *bi-conditional* statement, which is true only when both statements have the same truth value.

The negation of a statement *p* is a statement *q* that is true precisely when *p* is false. We denote the negation of *p* as $\sim p$. A statement that is always true is called a *tautology*, while a statement that is always false is called a *contradiction*. Two statements *p* and *q* are considered logically equivalent if the composite statement $p \leftrightarrow q$ (where $p \leftrightarrow q$ denotes bi-conditional) is a tautology.

In this paper, we introduce a new logical connective termed "justifies" and explore its properties. When two statements, *p* and *q*, are connected using "justifies", the resulting composite statement is called a Machiavellian statement and is denoted by $p < q$, and is read as "*p* justifies *q*". In this context, *p* is referred to as the "means", and *q* is referred to as the "ends". A Machiavellian statement is true precisely when the means is false and the ends are true.

The concept of Machiavellianism is rooted in the principle of "the ends justifying the means", as articulated by Machiavelli [1]. According to this principle, an individual's primary goal is deemed paramount, and any means or method can be employed to achieve it. Traditionally, a "Machiavellian" individual is someone who uses and manipulates others to serve their own purposes, as described by Christie and Geis [2].

2. RESULTS

2.0 Properties of the Machiavellian Statement

Remark 2.0. The following are some of the properties of the conjunction and disjunction [3].

1. $p \wedge q \equiv q \wedge p$;
2. $p \vee q \equiv q \vee p$;
3. $(p \wedge q) \wedge r \equiv p \wedge (q \wedge r)$;
4. $(p \vee q) \vee r \equiv p \vee (q \vee r)$;
5. $(p \vee q) \wedge r \equiv (p \wedge r) \vee (q \wedge r)$;
6. $(p \wedge q) \vee r \equiv (p \vee r) \wedge (q \vee r)$;
7. $\sim(p \wedge q) \equiv \sim p \vee \sim q$, and $\sim(p \vee q) \equiv \sim p \wedge \sim q$ (*De Morgan's Laws*);
8. $p \wedge p \equiv p$, and $p \vee p \equiv p$ (*Idempotent Laws*).
9. $\sim(\sim p) \equiv p$

Remark 2.1. *Let p and q be statements. Then* $p < q \equiv \sim q < \sim p$.

To see this, we have Table 4 below.

Table 4: $(p < q)$ and $(\sim q < \sim p)$ are logically equivalent.

p	q	$p < q$	$\sim p$	$\sim q$	$\sim q < \sim p$	$(p < q) \leftrightarrow (\sim q < \sim p)$
T	*T*	*F*	*F*	*F*	*F*	*T*
T	*F*	*F*	*F*	*T*	*F*	*T*
F	*T*	*T*	*T*	*F*	*T*	*T*
F	*F*	*F*	*T*	*T*	*F*	*T*

Remark 2.2. *Let p and q be statements. Then* $p < q \equiv \sim p \wedge q$.

To see this, we have Table 5 below.

Table 5: $(p < q)$ and $(\sim p \wedge q)$ are logically equivalent.

p	q	$p < q$	$\sim p$	$\sim p \wedge q$	$(p < q) \leftrightarrow (\sim p \wedge q)$
T	*T*	*F*	*F*	*F*	*T*
T	*F*	*F*	*F*	*F*	*T*
F	*T*	*T*	*T*	*T*	*T*
F	*F*	*F*	*T*	*F*	*T*

Corollary 2.3. *Let p and q be statements. Then* $\sim p < q \equiv (p \wedge q)$.

Proof : By Remark 2.2 we have, $\sim p < q \equiv \sim(\sim p) \wedge q$. Hence, $\sim p < q \equiv p \wedge q$. *QED*

Corollary 2.4. *Let p and q be statements. Then* $\sim(p < q) \equiv p \wedge \sim q$.

Proof : By Remark 2.2 we have, $\sim(p < q) \equiv \sim(\sim p \wedge q)$. Hence, by *De Morgan's Law*, we have $\sim(p < q) \equiv \sim(\sim p) \vee \sim q$. Therefore, $\sim(p < q) \equiv p \vee \sim q$. *QED*

Corollary 2.5.*Let p and q be statements. Then* $\sim(p < \sim q) \equiv p \vee q$.

Proof : By Remark 2.2 we have, $\sim(p < \sim q) \equiv \sim(\sim p \wedge \sim q)$. Hence, by *De Morgan's Law*, we have $\sim(p < \sim q) \equiv \sim(\sim p) \vee \sim(\sim q)$. Therefore, $\sim(p < \sim q) \equiv p \vee q$. *QED*

Theorem 2.7. *Let p, q and r be statements. Then* $p < (q < r) \equiv (p \vee q) < r$.

Proof: We have,

$p < (q < r) \equiv \sim p \wedge (q < r)$, by Remark 2.2

$\equiv \sim p \wedge (\sim q \wedge r)$, by Remark 2.2

$\equiv (\sim p \wedge \sim q) \wedge r$, by Remark 2.0 (3)

$\equiv \sim(p \vee q) \wedge r$, by De Morgan's Law

$\equiv (p \vee q) < r$, by Remark 2.2.

Therefore, $p < (q < r) \equiv (p \vee q) < r$. *QED*

Theorem 2.8.*Let p, q and r are statements. Then* $(p < r) \wedge (q < r) \equiv (p \vee q) < r$.

Proof: We have,

$(p < r) \wedge (q < r) \equiv (\sim p \wedge r) \wedge (\sim q \wedge r)$, by Remark 2.2

$\equiv \left[(\sim p \wedge r) \wedge \sim q\right] \wedge r$, by Remark 2.0 (3)

$\equiv \left[(r \wedge \sim p) \wedge \sim q\right] \wedge r$, by Remark 2.0 (1)

$\equiv \left[r \wedge (\sim p \wedge \sim q)\right] \wedge r$, by Remark 2.0 (3)

$\equiv \left[(\sim p \wedge \sim q) \wedge r\right] \wedge r$, by Remark 2.0 (1)

$\equiv (\sim p \wedge \sim q) \wedge (r \wedge r)$, by Remark 2.0 (3)

$\equiv (\sim p \wedge \sim q) \wedge r$, by Remark 2.0 (8)

$\equiv \sim(p \vee q) \wedge r$, by De Morgan's Law

$\equiv (p \vee q) < r$, by Remark 2.2.

Therefore, $(p < r) \wedge (q < r) \equiv (p \vee q) < r$. *QED*

Theorem 2.9.*Let p, q and r be the statements. Then* $(p < r) \vee (q < r) \equiv (p \wedge q) < r$.

Proof: We have,

$(p < r) \vee (q < r) \equiv (\sim p \wedge r) \vee (\sim q \wedge r)$, by Remark 2.2

$\equiv (\sim p \vee \sim q) \wedge r$, by Remark 2.0 (5)

$\equiv \sim(p \wedge q) \wedge r$, by De Morgan's Law

$\equiv (p \vee q) < r$, by Remark 2.2.

Therefore, $(p < r) \vee (q < r) \equiv (p \wedge q) < r$. *QED*

3. CONCLUSION

In this paper, we introduce the concept of the Machiavellian statement along with the logical connective 'justifies'. Furthermore, we establish several properties and equivalences using truth tables and logical reasoning. However, there remain open questions regarding additional properties, equivalences, and the relationship with other logical connectives.

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