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THE MATHEMATICAL BASIS OF DEBIT AND CREDIT
AN EDUCATIONAL TOOL

by

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Abstract

This paper presents a method of explaining to accounting majors (or others) why the accounting mechanism of debit and credit works, i.e., functions as it does. The method utilizes the mathematical system known as a "group." A group consists of a set of elements together with an operation (meeting certain criteria) defined on the set. Analysis presented in the paper argues that the group concept is embedded in orthodox accounting methodology.

Purpose and Scope of the Paper

The purpose of this paper is to present a method of explaining to accounting majors (or others) why the double entry accounting mechanism of debit and credit (Dr/Cr) functions as it does, i.e., why it "works."

Students are often left to accept the Dr/Cr mechanism on faith alone. After an introductory treatment in both beginning accounting and intermediate accounting, the mechanics of Dr/Cr are never again rigorously examined. This paper provides an educational tool that explains in a mathematically rigorous way why the Dr/Cr mechanism works.

Method

The method utilized will be to analyze the structure of the Dr/Cr mechanism in terms of a mathematical algebra known as a group. The analysis will proceed in a manner similar to the deductive reasoning of a geometric proof. The goal of the analysis will be to establish a group character to the Dr/Cr mechanism.

The educational tool referred to above is the group structure of the Dr/Cr mechanism.
Mathematical Theory

Regarding mathematical theory, Benner (Benner et al., 1962, p. 1) explains:

A mathematical system consists of a set of elements, relations among its elements, operations on its elements, postulates, definitions, and theorems. ... The postulates are statements concerning the elements, relations, and operations of the system. These postulates are assumed to be valid for the system and they form a basis from which further properties can be developed. These deduced properties are called theorems.

A mathematical system, then, is based upon assumptions, i.e., postulates (also known as axioms), and utilizes deductive reasoning to derive other properties of the system, i.e., theorems.

According to Dean (1966, p. 22):

In mathematics the word "algebra" refers to a mathematical system in which all the operations on a set are finitary.

And he also states (p. 21):

...(A)n abstract algebra is a set $S$ of elements together with a number of operations and relations on $S$.

One of the simplest of abstract algebras is known as a "group." Kargapolov and Merzljakov (1979, p. xiv) indicate the magnitude of the impact of this concept as follows:

At the present time, group theory is one of the most highly developed branches of algebra, with numerous applications both within mathematics and beyond its boundaries: for instance to topology, function theory, crystallography, quantum mechanics, among other areas of mathematics and the natural sciences.

This paper demonstrates the applicability of group theory to accounting. The justification for such analysis is that it allows accounting to be conceptualized and studied as a mathematical system.

The Group Concept

The following three definitions were taken (with modifications) from Dean (1966, pp. 14, 24, 28, 30, 31).

Definition. A closed binary operation on a set $A$ is a mapping from $A \times A$ into $A$.

A closed binary operation, then, is a rule that indicates how to combine a pair of elements of the set $A$ to obtain an element of the set $A$. 
**Definition.** A group is a nonempty set of elements $S$ together with a closed binary operation defined on $S$, here denoted $(o)$, which satisfies the following axioms:

G1. The operation $(o)$ is associative: For every triple $(a, b, c)$ of elements from $S$, $(a o b) o c = a o (b o c)$.

G2. Under $(o)$, $S$ possesses a unique identity element: there exists an element $e$ in $S$ such that, for every $a$ in $S$, $a o e = a$, $e o a = a$.

G3. For the identity element $e$ there is for every $a$ in $S$ a unique inverse element $a^*$ such that $a o a^* = e$, $a^* o a = e$.

**Definition.** A group is called commutative or **abelian** if the following axiom holds:

G4. For every pair $a$, $b$ of elements from $S$, $a o b = b o a$.

As an example of a group consider the set of all even integers under addition. Addition is a closed binary operation on the set because the sum of any two even integers is an even integer, i.e., the result of the operation, the sum, is a member of the set, even integers. G1 is satisfied because addition on the even integers is associative, i.e., $(a + b) + c = a + (b + c)$, or, using integers, $(2 + 4) + 6 = 2 + (4 + 6)$. G2 is satisfied because $0$ (an even integer) is the unique additive identity, i.e., if $a$ is a member of $S$, then $a + 0 = a$. G3 is satisfied since for every even integer $a$ the additive inverse $-a$ is also an even integer, i.e., for the even integer $2$, its additive inverse $-2$ is also an even integer, and $2 + (-2) = 0$, where $0$ is the additive identity. The set of all even integers under addition, then, forms a group. Note also that the group is abelian in that G4 is satisfied because addition on the even integers is commutative, i.e., $a o b = b o a$, or, using integers, $2 + 4 = 4 + 2$.

**Applying The Group Concept To Accounting**

To show that accounting is a group:

1. The accounting information set must be specified.
2. The relevant accounting operation must be identified and shown to be closed on the set.
3. The operation must be shown to be associative on the set (G1).
4. The identity element for the operation must exist and be a member of the set and be unique (G2).
5. The inverse element for the operation must exist and be a member of the set and be unique (G3).

To show that the above group is abelian:

6. The operation must be shown to be commutative on the set (G4).
The Specified Accounting Set

Let the activity of a given accounting entity be classified into accountable entity activity (i.e., activity admitted into the accounts of the entity) and nonaccountable entity activity (i.e., activity not admitted into the accounts).

Include as accountable entity activity all exchanges of the entity over the life of the entity (i.e., exchanges that have already occurred plus those that have yet to occur). There is, therefore, no time dimension applicable to accountable entity activity (as it is defined herein). In addition, include as accountable entity activity allocations and reclassifications (as required by orthodox accounting) of the original exchanges of the entity.

Let the accountable entity activity (i.e., the exchanges of the entity with other entities) be further classified in accordance with orthodox accounting.

All entity activity, then, can be classified into accountable and nonaccountable, and the accountable can be additionally classified into consideration received/consideration given and other aspects of the asset, expense, revenue, equity classification scheme (including allocations and reclassifications of exchanges).

Let the set $S$ consist of all $x$ such that $x$ is a classified exchange which has occurred or will occur of the entity, or $x$ is an allocation or reclassification of exchange data, or $x$ is a combination of classified exchanges or allocations or reclassifications of the entity, or $x$ is a nonaccountable activity of the entity (i.e., entity activity classified as nonaccountable).

Let the nonaccountable activity of the entity be represented by $e$. Call $e$ the null exchange. (Note that $e$ will later be used to also represent certain combinations of exchanges of the entity, specifically those combinations that result in the null exchange.) Let the accountable entity activity (i.e., classified exchanges, allocations, reclassifications) be represented by lower case letters other than $e$, e.g., $a$, $b$, $c$, ....

The Accounting Operation and Closure

Let the operation $(o)$ be that of combining classified entity activity, i.e., combining in the manner of double entry accounting.

A central feature of the double entry accounting mechanism is its ability to compress the mass of an entity's exchanges (and allocations and reclassifications) into a form that is more understandable (Littleton, 1953, p. 36). It does so by combining together exchanges (i.e., portions of exchanges) and allocations and reclassifications that are classified in the same way, e.g., cash, inventory, etc.

That the operation $(o)$ is closed on set $S$ is evident. $S$ includes all classified exchanges of the entity and combinations of those exchanges. Clearly, if $a$ and $b$ are exchanges (members of the set
$S$, then combining the two will result in a combination of exchanges (which is a member of set $S$) so that

$$a \circ b = c,$$

where $a$, $b$, $c$, are members of $S$.

and closure of (o) on $S$ is established. Note that if either $a$ or $b$ or both is already a combination of exchanges, then their combination will result in yet another combination of the exchanges of $S$, and closure is preserved.

Combining an element of the set with $c$, the null exchange (also a member of $S$), will result in an element of the set (and therefore closure) as explained below in the discussion of the identity element (G2).

**The Associative Property (G1)**

G1 is satisfied because combinations of exchanges via double entry accounting is associative, i.e., $(a \circ b) \circ c = a \circ (b \circ c)$. For example, let

<table>
<thead>
<tr>
<th>Dr</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr</td>
<td>Notes Payable</td>
</tr>
<tr>
<td>Dr</td>
<td>Inventory</td>
</tr>
<tr>
<td>a</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dr</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr</td>
<td>Accounts Payable</td>
</tr>
<tr>
<td>Dr</td>
<td>Supplies</td>
</tr>
<tr>
<td>b</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dr</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr</td>
<td></td>
</tr>
</tbody>
</table>

Then the result of $a \circ b$ combined with $c$ is the same as $a$ combined with $b \circ c$, i.e.,

<table>
<thead>
<tr>
<th>Dr</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr</td>
<td>Inventory</td>
</tr>
<tr>
<td>Dr</td>
<td>Supplies</td>
</tr>
<tr>
<td>Cr</td>
<td>Notes Payable</td>
</tr>
<tr>
<td>Cr</td>
<td>Accounts Payable</td>
</tr>
<tr>
<td>Cr</td>
<td>Cash</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dr</th>
<th>Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td></td>
</tr>
</tbody>
</table>

**The Identity Element (G2)**

G2 is satisfied because of the existence of an identity element, i.e., $c$, the null exchange,

<table>
<thead>
<tr>
<th>Dr</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr</td>
<td></td>
</tr>
</tbody>
</table>

The identity $c$ combined with any exchange $a$ results in exchange $a$.

For example, let

<table>
<thead>
<tr>
<th>Dr</th>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td></td>
</tr>
</tbody>
</table>
then
\[ a \circ g = a. \]

since
\[
\begin{array}{cc}
\text{Dr} & \text{Cash} \\
\text{Cr} & \text{Capital}
\end{array}
\]

combined with
\[
\begin{array}{c}
\text{Dr} \\
\text{Cr}
\end{array}
\]

results in
\[
\begin{array}{cc}
\text{Dr} & \text{Cash} \\
\text{Cr} & \text{Capital}
\end{array}
\]

Uniqueness of the identity \( e \) can be established by considering whether any element of \( S \) besides \( e \) exists that when combined with any element \( a \) of \( S \) results in element \( a \). Assume such an element does exist and call it \( f \). Then,
\[ a \circ f = a. \]

Let
\[
\begin{array}{cc}
\text{Dr} & \text{Cash} \\
\text{Cr} & \text{Capital}
\end{array}
\]

What element of \( S \) can exist that when combined with \( a \) results in
\[
\begin{array}{cc}
\text{Dr} & \text{Cash} \\
\text{Cr} & \text{Capital}
\end{array}
\]

The element \( f \) must be an exchange of the entity or an allocation or a reclassification or a combination of these items because the other elements of \( S \), i.e., nonaccountable entity activity, are already represented by \( e \), the null exchange. It is clear that \( f \) cannot be any single exchange (or allocation or reclassification) since this exchange would be classified into specific debit and credit components, i.e.,
\[
\begin{array}{cc}
\text{Dr} & \text{Account X} \\
\text{Cr} & \text{Account Y},
\end{array}
\]

and this combined with \( a \) would yield
\[
\begin{array}{cc}
\text{Dr} & \text{Cash} \\
\text{Dr} & \text{Account X} \\
\text{Cr} & \text{Capital} \\
\text{Cr} & \text{Account Y},
\end{array}
\]

and this is not the same as \( a \).

Suppose \( f \) is a combination of exchanges of the entity. What combinations of exchanges exist that when combined with \( a \) results in \( a \)? Many can be proposed since the only requirement is that the combined exchanges have no effect on \( a \). Any pair of original exchange and "inverse" exchange will suffice. For example, suppose
\[ \text{Dr} \quad \text{Cash} \]
\[ \text{Cr} \quad \text{Notes Payable} \]

(borrowing money)

and

\[ \text{Dr} \quad \text{Notes Payable} \]
\[ \text{Cr} \quad \text{Cash} \]

( repayment of the loan)

then \( f = h \circ g \) would result in

\[ \begin{align*}
\text{Dr} & \quad \quad \quad \quad \\
\text{Cr} & \quad \quad \quad \quad \\
\end{align*} \]

and this combined with \( a \) would result in

\[ \begin{align*}
\text{Dr} & \quad \text{Cash} \\
\text{Cr} & \quad \text{Capital}. \\
\end{align*} \]

But

\[ \begin{align*}
\text{Dr} & \quad \quad \quad \\
\text{Cr} & \quad \quad \quad \\
\end{align*} \]

has already been defined as \( g \), and therefore \( g \) is unique.

**Inverse Elements (G3)**

For each element \( a \) in \( S \), there exists in \( S \) an inverse \( a^* \) for element \( a \) such that \( a \circ a^* = e \). For example, let

\[ \begin{align*}
\text{Dr} & \quad \text{Cash} \\
\text{Cr} & \quad \text{Notes Payable}. \\
\end{align*} \]

Ignoring interest, the inverse exchange will occur when the note is paid,

\[ \begin{align*}
\text{Dr} & \quad \text{Notes Payable} \\
\text{Cr} & \quad \text{Cash}. \\
\end{align*} \]

The inverse exchange \( a^* \) combined with the original exchange \( a \) will result in the identity \( e \), i.e., \( a \circ a^* = e \), e.g.,

\[ \begin{align*}
\text{Dr} & \quad \text{Cash} \\
\text{Cr} & \quad \text{Notes Payable} \\
\end{align*} \]
combined with

\[ \begin{align*}
\text{Dr} & \quad \text{Notes Payable} \\
\text{Cr} & \quad \text{Cash} \\
\end{align*} \]
will result in
\[ \text{Dr } _____ \]  \[ \text{Cr } _____ \]

For some types of exchanges, for example revenue exchanges, the inverse is less clear; no single inverse exchange exists, however, over the life of the entity the effect of such an exchange does occur (remember that \( S \) is defined to be exchanges over the life of the entity).

Consider the following,
\[ \text{Dr Accounts Receivable} \]
\[ \text{Cr Sales} \]

An inverse for this exchange can be demonstrated, but it is the composite effect of two items, an exchange and an allocation (and only parts of the exchange and the allocation carry the inverse effect). The inverse for the accounts receivable debit (i.e., the accounts receivable credit) is found in the exchange that collects the account receivable,
\[ \text{Dr Cash} \]
\[ \text{Cr Accounts Receivable} \]

The sales portion is reversed as part of the allocation of revenue to the time period made under orthodox accounting practices, i.e.,
\[ \text{Dr Sales} \]
\[ \text{Cr Income Summary} \]

The above allocation can be linked to an exchange in the following way. The above is an allocation to a time period and results in an increase in owners' equity (for example, retained earnings for a corporation) and the effect of this increase is part of the final exchange of the entity, i.e., the transfer of residual assets to owners when the entity ceases to exist. For example, consider the following exchange for a corporation,
\[ \text{Dr Retained Earnings} \]
\[ \text{Cr Cash} \]

The reduction in retained earnings is analogous to the debit to sales above that allocates to periodic revenue.

In a similar way one can argue that the effect of a reclassification, for example,
\[ \text{Dr Work In Process} \]
\[ \text{Cr Raw Material Inventory}, \]
will eventually be included in an exchange.
Argument for existence of inverses is strengthened by considering that over the life of the entity from start to finish (as $S$ is defined) all exchanges are "reversed," i.e., the beginning balance sheet is a blank, e.g.,

\[
\begin{array}{ll}
& \\
\end{array}
\]

and so is the ending, e.g.,

\[
\begin{array}{ll}
& \\
\end{array}
\]

as well as all revenue and expense accounts.

The inverse $a^*$ is clearly unique for certain types of exchanges. For example, if

\[
\begin{array}{ll}
\text{Dr} & \text{Cash} \quad 5,000 \\
\text{Cr} & \text{Notes Payable-X Company} \quad 5,000 \\
\end{array}
\]

(notice that dollar amounts are included in the example to identify the specific exchange $a$; in addition there would be a specific incurrence date and a due date and the physical note itself to identify $a$), then the specific exchange on the due date to pay off the note (ignoring interest) would be

\[
\begin{array}{ll}
\text{Dr} & \text{Notes Payable-X Company} \quad 5,000 \\
\text{Cr} & \text{Cash} \quad 5,000, \\
\end{array}
\]

and there would be no other exchange in payment of this specific note. Therefore, $a^*$ is unique.

In a similar way the uniqueness of the inverse for revenue or expense exchanges can be demonstrated. For example, if

\[
\begin{array}{ll}
\text{Dr} & \text{Accounts Receivable-X Company} \quad 5,000 \\
\text{Cr} & \text{Sales} \quad 5,000 \\
\end{array}
\]

(notice that the exchange will occur in a specific time period with a specified due date on the account receivable), then (again using composite exchanges, allocations) part of the $a^*$ will be the collection of the account receivable, i.e.,

\[
\begin{array}{ll}
\text{Dr} & \text{Cash} \quad 5,000 \\
\text{Cr} & \text{Accounts Receivable-X Company} \quad 5,000, \\
\end{array}
\]

and part of the $a^*$ will be included in the allocation of revenues to that specific time period, i.e.,
Dr Sales XX Income Summary XX.

The composite inverse effect $a^*$ is unique, i.e., receipt of payment on a specified account and allocation of revenue to a specified time period.

It is obvious that the null exchange $e$ is its own inverse for

\[
\begin{array}{cc}
\text{Dr} & \quad \text{Cr} \\
\quad & \quad \\
\text{combined with} & \\
\text{Dr} & \quad \text{Cr} \\
\quad & \quad \\
\text{results in} & \\
\text{Dr} & \quad \text{Cr} \\
\quad & \quad \\
\text{the null exchange, and therefore} & \\
e \circ e = e.
\end{array}
\]

It should also be obvious that the inverse for an exchange can precede temporally the exchange itself. This causes no concern because there is no time dimension on the set $S$. For example, if the exchange is payment of a note, i.e.,

\[
\begin{array}{cc}
\text{Dr} & \quad \text{Notes Payable} \\
\quad & \quad \\
\text{a} & \quad \text{Cr} \\
\quad & \quad \text{Cash},
\end{array}
\]

then the inverse $a^*$ would be the exchange for borrowing the money, i.e.,

\[
\begin{array}{cc}
\text{Dr} & \quad \text{Cash} \\
\quad & \quad \\
\text{a}^* & \quad \text{Notes Payable},
\end{array}
\]

for then $a \circ a^*$ would equal $e$.

\[
\begin{array}{cc}
\text{Dr} & \quad \\
\quad & \quad \\
\text{a} & \quad \text{Cr} \\
\quad & \quad \\
\text{for then} & \quad \\
\text{a} \circ a^* & \quad \\
\end{array}
\]

The above arguments are persuasive evidence for the existence of an inverse in set $S$ for each element in set $S$. The conditions of G3, then, are met.

**Inverses - A Different Approach**

There is another approach that could have been taken to establish inverses. If the set $S$ had been defined not as exchanges, allocations, reclassifications, and combinations of these elements, but rather as the individual halves of the exchanges, allocations, reclassifications, (i.e., the consideration given in a particular exchange, the consideration received; the specific debit in a particular allocation or reclassification, the specific credit), and combinations of these elements,
then the difficulty encountered in establishing certain inverses (i.e., the reliance upon the composite effect of exchanges, allocations, reclassifications) could have been avoided.

Take, for example, the sale exchange discussed above, i.e.,

\[ a = \text{Dr Accounts Receivable} \]
\[ b = \text{Cr Sales} \]

The inverse of the accounts receivable entry is found in the exchange for collection of the receivable, i.e.,

\[ c = \text{Dr Cash} \]
\[ d = \text{Cr Accounts Receivable} \]

and the inverse is the half of the exchange that recognizes the reduction of the accounts receivable, i.e.,

\[ d = \text{Cr Accounts Receivable} \]
\[ e = \text{Dr Cash} \]

since \( a \circ d = e \). The sales portion is reversed as part of the allocation of revenue to the time period, i.e.,

\[ f = \text{Dr Sales} \]
\[ g = \text{Cr Income Summary} \]

and the inverse is the half of the entry that allocates revenue from the sales account, i.e.,

\[ f = \text{Dr Sales} \]
\[ g = \text{Cr Income Summary} \]

As discussed in this section the difficulties of the original analysis of inverses could have been avoided by redefining the set \( S \) to be half exchanges, allocations, reclassifications, and also combinations of these elements; nevertheless, the original approach was retained because the author wished to integrate exchanges (i.e., transactions) in the discussion as directly as possible. This position regarding the importance of exchanges is well established in accounting literature; see, for example, Littleton (1953, p. 36), Schrader (1962, p. 646), and Willingham (1964, p. 550).

**The Commutative Property (G4)**

G4 is satisfied because \( a \circ b = b \circ a \), i.e., the order of combination of two elements of \( S \) is irrelevant; the same result is obtained. For example, let

\[ a = \text{Dr Cash} \]
\[ b = \text{Cr Capital} \]

and

\[ c = \text{Dr Purchases} \]
\[ d = \text{Cr Cash} \]

Regardless of the sequence of combination, \( a \circ b \) or \( b \circ a \), the effect is the same, i.e.,

\[ e = \text{Dr Cash} \]
\[ f = \text{Dr Purchases} \]
\[ g = \text{Cr Capital} \]
\[ h = \text{Cr Cash} \].
Conclusions

The above analysis demonstrates that the set of classified entity activity (both accountable and nonaccountable) over the life of an accounting entity together with the operation of combination of classified entity activity by double entry accounting comprise a mathematical group (via G1, G2, G3). The identity element is the null exchange, and the inverse is the exchange or allocation or reclassification that "reverses" the original exchange or allocation or reclassification under consideration.

In addition, G4 reveals that this group is abelian.

Limitations

There are weak points in the arguments presented in the paper.

In establishing G3, the existence of inverses, use was made of composite exchanges and allocations and reclassifications made over time. No single exchange or allocation or reclassification exists as an inverse for certain exchanges. Even though plausible, should such an approach be allowed? Is the relaxing of the inverse criteria sufficiently damaging to negate group status? (Note that if G3 is not allowed and G2 is ignored, the resulting mathematical system (i.e., G1) is known as a semigroup.)

Regarding the set $S$, the inclusion of all exchanges over the life of an entity (particularly exchanges that have not yet occurred but will occur) may seem to some to be a limitation, especially when consideration is given to the going concern assumption where the cessation of an entity is not expected to occur. Going concern implies (or seems to imply) an infinite set of exchanges, but the set being infinite causes no mathematical problem.

A more questionable aspect of the definition of $S$ (at least from a practical standpoint) is the inclusion of entity activity that is not admitted to the accounts, i.e., entity activity classified as nonaccountable. This was necessary in order to establish the identity element $e$, the null exchange, as an element of the set. This approach was retained even though $e$ also results from the combination of elements with their inverses, i.e.,

$$a \circ a^* = e.$$
explicit inclusion of matching of revenues and expenses, a deficiency even more serious than lack of measurement.

Future research may yield more satisfactory definitions of the set $S$ and operation $(o)$.

**Summary**

The operation of combining classified entity activity defined on the set of classified entity activity (i.e., classified exchanges, allocations and reclassifications of exchanges, combinations of classified exchanges or allocations or reclassifications, and entity activity classified as nonaccountable - the null exchange) over the life of an accounting entity has been shown to be a group.

Group structure establishes a mathematical foundation for the Dr/Cr mechanism of double entry accounting and provides an educational tool for explaining why the mechanism works.

**References**


Byrne, G.R., "To What Extent Can the Practice of Accounting Be Reduced to Rules and Standards?," *Journal of Accountancy* (November 1937), pp. 364-379.

Committee on Terminology, American Institute of Certified Public Accountants (AICPA), *Accounting Terminology Bulletin No. 1, Review and Resume*, (AICPA, 1953).


