JAINA LOGIC ON MATRIX

R.Malathi
Asst.Prof.of Mathematics, SCSVMV
malathihema@yahoo.co.in

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Abstract: **In this paper, we focus our concentration upon the Jaina doctrine of syat. It is popularly known as "Syadvada". We show that Jaina Logic, when viewed as a multiple valued logic, has inherent Rules of Reference of Mathematical Logic, which can be used to develop matrix for Jaina Logic.**

Key Words: **Syadvada, Multiple Valued Logic, properties of matrix**

I. INTRODUCTION

Due to the limitations of the human mind, it is impossible to consider all aspect of human reality. However, we can consider each aspect at a time. Since, it is a relative approach, each prediction can be confirmed or rejected using seven different possibilities, ranging from "Is" to "Is not". Using this approach, it can be made the seven statements about an object or reality, its affirmation, negation and indescribability as follows[2].

(1) Perhaps X is.
(2) Perhaps X is not.

These two aspects are inherent in the same thing; hence we can say

(3) Perhaps X is and is not; here we are contemplating the whole thing in its two aspects which are kept apart and attended to severally. But these two aspects are inherent in and expressive of one single identity. Hence, they may be considered together jointly as expressing the single identity.
(4) Perhaps X is indescribable.

Remembering this helpless nature of our tongue, we may still qualify this by each of the first three predicates. Thus we have the last three modes of predications, which are:

(5) Perhaps X is though indescribable.
(6) Perhaps X is not though indescribable.
(7) Perhaps X is and is not though indescribable.

Thus practically, **every attribute by being affirmed and denied according to different aspects may bring about seven fundamental propositions true of real subject.**

The classical two – valued logic can be extended into n-valued logic ($n \geq 2$). Several n – valued logic were, in fact developed in the 1930s. The set T_n of truth values of an n – valued logic is thus defined as

$$T_n = \left\{0 = \frac{0}{n-1}, \frac{1}{n-1}, \frac{2}{n-1}, \ldots\ldots, \frac{n-2}{n-1}, \frac{n-1}{n-1} = 1\right\}$$

Hence, assigning logical numerical values to the seven fold judgment the Jaina logic is defined

$$\text{as } T_7 = \left\{0 = \frac{0}{7-1}, \frac{1}{7-1}, \frac{2}{7-1}, \frac{3}{7-1}, \frac{4}{7-1}, \frac{5}{7-1}, \frac{6}{7-1} = 1\right\}$$

$$= \left\{0, \frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}, 1\right\}$$

Thus, correlating the symbols and the numerical values of Jaina logic we get,

F	F&I	T&F	I	T,F&I	T&I	T
0	1/6	2/6	3/6	4/6	5/6	1

We observe that when we move from left to right, we gradually move from false to truth[5].

A = max (a, b)

0	1/6	1/3	1/2	2/3	5/6	1
1/6	1/6	1/3	1/2	2/3	5/6	1
1/3	1/3	1/3	1/2	2/3	5/6	1
1/2	1/2	1/2	1/2	2/3	5/6	1
2/3	2/3	2/3	2/3	2/3	5/6	1
5/6	5/6	5/6	5/6	5/6	5/6	1
1	1	1	1	1	1	1

rank(A) = 7 ; trace(A) = 7/2

poly(A) = 1 -7/2 -133/18 -28/9 -25/48 -319/7776 -71/46656 -1/46656

Roots (poly(A)) = 1793/353 -553/515 -199/856 -503/4611 -217/3161 -44/855 -129/2941

Eigen value (A) = -553/515 -199/856 -503/4611 -217/3161 -44/855 -129/2941 1793/353

[V D] = eigen value (A)

V =

1082/1933 265/539 681/1609 4013/11921
-647/2765 -181/1509 151/523
1743/3686 308/2213 -1178/5273 -3067/6381
1088/2077 6166/18361 2260/7579
1261/4034 -783/2501 -773/1462 -267/2038
-1079/2601 -2865/5914 513/1616
380/3661 -1429/2642 -128/4877 490/913
-92/9203 959/1789 646/1861
-144/1189 -499/1310 727/1408 -447/4534
543/1271 -61/127 401/1033
-553/1690 181/3472 64/237 -496/1003
-731/1408 1373/4181 781/1767
-1893/3923 459/1025 -369/949 1547/4988
1452/6727 -211/1906 223/437

D =

-553/515	0	0	0	0	0	0
0	-199/856	0	0	0	0	0
0	0	-503/4611	0	0	0	0
0	0	0	-217/3161	0	0	0
0	0	0	0	-44/855	0	0
0	0	0	0	0	-129/2941	0
0	0	0	0	0	0	1793/353

[L U]= lu(A)

L =

0	1	0	0	0	0	0
1/6	0	1	0	0	0	0
1/3	0	0	1	0	0	0
1/2	0	0	0	1	0	0
2/3	0	0	0	0	1	0
5/6	0	0	0	0	0	1
1	0	0	0	0	0	0

U =

1	1	1	1	1	1	1
0	1/6	1/3	1/2	2/3	5/6	1
0	0	1/6	1/3	1/2	2/3	5/6
0	0	0	1/6	1/3	1/2	2/3
0	0	0	0	1/6	1/3	1/2
0	0	0	0	0	1/6	1/3
0	0	0	0	0	0	1/6

L*U =

0	1/6	1/3	1/2	2/3	5/6	1
1/6	1/6	1/3	1/2	2/3	5/6	1
1/3	1/3	1/3	1/2	2/3	5/6	1
1/2	1/2	1/2	1/2	2/3	5/6	1
2/3	2/3	2/3	2/3	2/3	5/6	1
5/6	5/6	5/6	5/6	5/6	5/6	1
1	1	1	1	1	1	1

A' =

0	1/6	1/3	1/2	2/3	5/6	1
1/6	1/6	1/3	1/2	2/3	5/6	1
1/3	1/3	1/3	1/2	2/3	5/6	1
1/2	1/2	1/2	1/2	2/3	5/6	1
2/3	2/3	2/3	2/3	2/3	5/6	1
5/6	5/6	5/6	5/6	5/6	5/6	1
1	1	1	1	1	1	1

det(A) = 1/46656

II. CONCLUSION

In this paper, we showed that Jaina Logic, when viewed as a multiple valued logic, has inherent Rules of Reference of Mathematical Logic, which can be used to develop matrix for Jaina Logic.

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