DIFFERENTATION AND FOUR-FOLD LOGIC

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Let f(x) be a function of x, and suppose that one is interested in finding the derivative of f(x) at x=a. The usual method is to give an increment to x, find the corresponding increment in f(x) and then work out the limit of the ratio of the latter to the former as the increment tends to zero. The derivative of f(x) at a is defind as $\underset{H \to 0}{ht} \frac{f(a+h)-f(a)}{a}$ when the limit exists.

In the procedure outlined above one is not intereste in finding out whether h actually takes the value zero. However the derivative of f(x) is defined at x = a, (ie when h = 0) and it is not meaningful to leave out the most important case when h is equal to zero.

This problem arises due to the use of two-fold logic in which h is either equal to zero or not equal to zero. The Mathematicians are forced not to consider the case when h = 0 even though the derivative of a function is found only at a definite point.

The problem is overcome in four-fold logic in which a proposition as well as its negation can be true at the same time. Thus when one uses four fold logic h can be both equal and not equal to zero.

Similar argument holds when one draws a tangent to a curve at a particular point. A meaningful interpretation to a tangent can be given only within the framework of four-fold logic.

References

De Silva, Nalin (1986) Mage Lokaya, Indika Publishers.

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