Conclusion

We have developed a general framework for analyzing and formulating the concept of Weight Function for p-adic integers in analogous to the Valuation Function. The norm derived from the Weight Function for p-adic integers considering them in the form of sequences coincide with that of Valuation Function. Hence, the results obtained by the employment of Weight Function will naturally match the results derived from that of the Valuation Function. The concept of the Weight Function could be extended to p-adic numbers by the consideration of negative weights as all the p-adic numbers are with finite tailed. This would provide a broader perspective of the Weight Function. The distribution of rational integers in the ring of p-adic integers by the employment of equinorm equivalence classes wears a beautiful shape because of which we could infer to the area of highest density for the nonrational p-adic integers in the ring \( \Omega_p \). Naturally, innumerable numbers of p-adic integers will lie within the area of distribution of rational integers. One will find himself ecstatic to determine the necessary criteria to be satisfied by a p-adic integer to lie within the area of distribution of rational integers. This opens up a new horizon of research in this particular domain.

We have undertaken a detailed analysis of the Carry-out Sequences associated with the p-adic integers during the process of evaluation of their addition, multiplication etc. We have shown how some preliminary properties of the Carry-out Sequences could be utilized in order to ascertain the algebraic structure of the p-adic integers. Besides we have shown that the concept of the Carry-out Sequences could help us in order to determine the existence of the inverse of a p-adic integer.

We have defined the Negative Annihilator(\( \psi \)) which is very useful in the evaluation of the negative of a p-adic integer. As in case of the Carry-out Sequences the concept of the Negative Annihilator can also be extended to the p-adic numbers with a suitable extension of its definition.

Finally, we have presented a general framework for the concept of Recurred and Functionally Recurred p-adic numbers. The significance of this concept will go a long way if it is exploited into broader perspectives. We have determined some representatives from rational integers of some equivalence classes, the inverse of which are recurred with a recurred set of fixed order and independent of the prime \( p \). Much more scope has always been there and it is an open field to be exploited.