

# Abstract

The major concerns of this research work is the field  $\mathbb{Q}_p$  and irreducibility criteria for polynomial with coefficients from the set of rational numbers and  $\mathbb{Q}_p$ . The field  $\mathbb{Q}_p$  is illustrated as completion of the set  $\mathbb{Q}$  with respect to p-adic norm. Commands of SageMath and Maple to find p-adic valuation, p-norm and p-adic expansion are also utilized here. The existing criteria for polynomials over  $\mathbb{Q}$  and  $\mathbb{Q}_p$  are explained with the help of software to make their application easier. By considering the general version of Jakhar's irreducibility criterion, the necessity and sufficiency is analyzed for particular version of this criterion for  $\mathbb{Q}_p$ . At the end, we have introduced an extended irreducibility criterion of Jakhar's criteria for quadratic polynomials over the field  $\mathbb{Q}_p$ .