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DIELECTRIC MODELLING OF LUNAR SURFACE BY BAYESIAN INVERSION TECHNIQUE

Abstract

Dielectric Constant is a important parameter which indicates the accumulation of electric flux in a material. In other words dielectric constant describes the type of material through which electromagnetic waves are subjected to. Till date only manned mission launched on the Moon are Apollo mission series. Samples collected in these missions give the approximate constituent of the lunar regolith. Machine learning based dielectric modelling of lunar surface can yield an approximate values of dielectric constant and thus the constituent of regolith in a particular area can be retrieved. There are various methods of doing inversion model in order to retrieve dielectric constant values. However the most approximate result which can be generated by Bayesian inversion technique. Bayesian inversion neural networks are probability based neural networks and includes the calculation of posterior probability density function. Thus, there is a mathematical approach in Bayesian neural network for estimating the output values. So by applying non linear regression model by Bayesian Inversion most approximate analysis can be done. This study includes the application of Bayesian Inversion technique on the study area as any Apollo mission landing site on lunar surface and retrieving the dielectric constant values. The data set utilized in this study are LRO Mini-RF data set. In result, the retrieved values of dielectric constant are then compared with the calculated dielectric values of lunar samples.