

Investigation of the electron density estimation method of MF radar system (DAE method) by using Full wave analysis

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MF radar estimates the electron density in lower ionospheric D and E regions at the altitude from 60km to 100km by using the partial reflection information of MF radar transmission wave. Though the electron density in ionospheric D region is very small, about 10-1000 /cc, electrons are closely related to neutral dynamic meteorology and chemistry including such as hydrated ion and NO_x in the region. Therefore, it has the possibility to find a new physical knowledge in mesosphere and lower ionosphere.

One of the methods to estimate the electron density by MF radar is DAE. DAE is a technique to estimate the electron density from the differential amount between the left and the right polarized wave reflected by the lower ionosphere. The validity of DAE has not been examined for more than 30 years.

We simulate the propagation characteristics of MF radar transmission wave from the ground and the lower ionosphere by using Full wave analysis. We investigate the validity of DAE method by using Full wave analysis.