

## Improvement of an estimation method of the electron density profile in the lower ionosphere with time domain Full wave

MIYAKE, Taketoshi<sup>1\*</sup> ; MORIYAMA, Hiroaki<sup>1</sup> ; ASHIHARA, Yuki<sup>2</sup> ; MURAYAMA, Yasuhiro<sup>3</sup> ; KAWAMURA, Seiji<sup>3</sup>

<sup>1</sup>Toyama Prefectural University, <sup>2</sup>Nara National College of Technology, <sup>3</sup>National Institute of Information and Communications Technology

We are going to simulate the observation process of the present MF radar system with the time domain Full wave method, and investigate the observation method with which we can obtain the precise electron density profile in the lower ionosphere.

One of the general methods to estimate the electron density in the present MF radar system is the differential absorption experiment (DAE) method.

The DAE method is a technique to estimate the electron density from the differential amount between the left and the right polarized waves reflected from the lower ionosphere.

We simulated the MF radar with time domain Full wave analysis and examined the DAE method.

We improved the DAE method by using appropriate parameters automatically, and succeeded to estimate more accurate electron density profiles in the lower ionosphere.

In the present improved DAE method, however, we can only find appropriate parameters in the case that the electron density increases with increase of the altitude.

Therefore, we are going to improve the DAE method, which is available in any case.

Keywords: Ionospheric D region, MF Radar, Full-wave method, DAE method