

## Automated estimation of electron density profile in the ionosphere by the radio wave propagation characteristics

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In the lower ionosphere, the approximate electron density profile can be estimated from the comparison between these observation results obtained by sounding rocket and propagation characteristics calculated with Full wave method. This estimation process, which is so-called "wave absorption method", has some problems. At first, we have no clear standard for comparing observation results and propagation characteristics calculated with Full wave method. In addition, we have to iterate many times correcting the electron density profile by handwork, calculating propagation characteristics with Full wave method and comparing observation results and calculated propagation characteristics. This iteration takes too long to estimate appropriate electron density profile. To reduce these problems, we developed an application to realize automated estimation of electron density profile by analyzing radio wave propagation characteristics.

At first, we decided the quantitative standard for comparing observation results and calculated propagation characteristics to realize this automated estimation application, Then, we analyzed variation effects of Full wave parameters and electron density profiles on calculated propagation characteristics, and developed the automated electron density estimation application. We succeed in estimating appropriate electron density profile automatically in very short time.

Keywords: ionosphere, plasma waves, electron density profile, Full wave method