A magnetic field model of the magnetosphere by conbining the Tsyganenko model with IGRF

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The Tsyganenko model of an empirical magnetic field model of the magnetosphere has been improved over the last two decades since Tsyganenko and Usmanov, 1982. Nowadays the Tsyganenko model is one of the most popular and useful tool for estimations of the magnetic field in the magnetosphere. In the model the magnetic field is calculated as summation of the fields caused by electrical currents flowing in the magnetosphere and the simple dipole field of the Earth, declining an accuracy of the calculation nearby the Earth.

In this study, we attempt to improve the Tsyganenko 2002 model, adopting the IGRF model instead of the dipole field as the Earth's magnetic field. The improvement is especially effective for the modeling of the ring current and field aligned currents near the Earth. We are also developing software to calculate and visualize the magnetic field by using Visual C# and DirectX. A demonstration of our software will be performed in the presentation.