A versatile model of Saturn's magnetospheric field

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We have used techniques and methods used by modelers for the earth's magnetosphere
to develop a new model of Saturn's magnetospheric field. We use Tsyganenko and
Peredo [1994] models of disk-shaped current sheets to model the magnetic field of
Saturn's current sheet. The tilt, and hinging of the current sheet is introduced by using
the general deformation technique [Tsyganenko, 1998]. The shielding field from the
magnetopause for the equatorial current sheet and the internal field is specified by
Cartesian and cylindrical harmonics, respectively. The model uses observations from
Pioneer, Voyager and Cassini spacecraft.

Our model consists of modules which specify (1) the internal axially symmetric spher-
ical harmonic model, (2) the ring current and the magnetotail current system, (3) the
field from the radial current system which reinforces corotation on the outflowing
plasma. (4) the shielding fields from an axially symmetric but hinged magnetopause
(5) and the interconnection magnetic field between solar wind IMF and the magneto-
sphere.

The structural model of the current sheet and the magnetopause is initially specified in
the Kronian Solar Magnetospheric (KSM) coordinate system. We then incorporate the
hinging of the magnetosphere at large distances by applying a general deformation. A
comparison of model field is presented with the observations.