



## **Test and comparison of different approaches of magnetotail magnetic flux calculation.**

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Generalization of the earlier used algorithm of magnetotail magnetic flux calculation is presented. The algorithm develops the Petrinec and Russell, 1996 (PR96) method of magnetotail radius  $R_T$  calculation based on simultaneous magnetotail and solar wind observations. The algorithm is based on the pressure balance on the magnetopause and in the plasma sheet. Contrary to the model PR96 expression for  $R_T$  as a function solar wind/IMF parameters, it allows one to calculate the actual  $R_T$  value and the tail magnetic flux using the measured lobe magnetic field.

Till now we used the algorithm for magnetotail data tailward of -15 Re, where the tail approximation is fulfilled. In the present study we generalize the method for the region inside -15 Re, where the dipole field contribution is significant. To obtain the open F value the dipole field is subtracted from the total magnetic field.

We test the algorithm on a CCMC global simulation, comparing the F values, calculated by the algorithm, with the flux values obtained by direct integration through the magnetotail cross-section at  $X = -15$  Re. The analysis shows good results (cc > 0.9, regression coefficients about 0.8-0.9) for measurements in the tail lobes at X as close to the Earth as -7 Re.

We also compare the F values obtained by the modified algorithm based on Cluster observations in the tail lobes with open magnetic flux  $F_o$  values based on global auroral images from IMAGE spacecraft. Similarities and differences between F and  $F_o$  values are discussed.