# The Analytic Properties of the Flapping Current Sheets in the Magnetotail

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The current sheet in Earth's magnetotail may often flaps and the induced flapping waves propagate towards the dawn and dusk flanks, which results in the local tilted current sheet generally, as observed by the spacecrafts. On the basis of the Cluster's observation results on the magnetic geometry of magnetic field lines in the current sheet, this research studies the analytic properties of the flapping current sheets systemically. The approximate model for the magnetic field in the flapping current sheets has been obtained by analogy with Harris current sheet, so that the associated physical quantities could be directly calculated and analyzed. The applications of the magnetic rotation analysis to the tilted current sheets have quantitatively revealed the spatial distribution of the curvature of magnetic field lines and the half-thickness of the neutral sheet. The obtained results are in consistency well with the observations by Cluster, but also yield new theoretic results for the flapping CS, which could deepen the understanding on the characteristics of tilted current sheet and be helpful for uncovering the flapping mechanism of current sheet.