

Abstract

Numerous authors have proven the existence of kinetic Alfvén waves (KAWs) in the magnetosphere of the Earth. Moreover, in the aforementioned region, solitary waves with bipolar electric fields are frequently observed. Motivated by the reported observations of KAWs and solitary waves in the Earth's magnetosphere, we investigate solitary KAWs (SKAWs) in the terrestrial magnetosphere and try to study the influence of the Cairns-Tsallis distribution on SKAWs in the aforementioned region using an analytical model. In this model, SKAWs are investigated using the Sagdeev potential technique in a low- β electron-ion plasma with Cairns-Tsallis distributed electrons and fluid ions. Based on the graphical analysis of the expressions for Sagdeev potential, soliton potential, and its associated bipolar electric field, we argue that our findings are consistent with the reported literature.