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Interactive comment on "On application of asymmetric Kan-like exact equilibria to the Earth magnetotail modeling" *by* Daniil B. Korovinskiy et al.

Anonymous Referee #2

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The paper extends an earlier study of Semenov et al., 2015 to justify the applicability of the earlier obtained solution of a bent current sheet in magnetotail studies. The paper is written clearly (except some minor problems listed below) and the paper subject is within the scope of the AG journal. Hence, I recommend to publish this paper after some revisions.

My only major comment is for the abstract. The first sentence of the abstract is confusing. As the authors say later on Page 2, in Lines 28-30, they actually don't develop any new solution. Rather they investigate applicability of an earlier-obtained solution to the magnetotail current sheet. The same is relevant for the first bullet in the "summary" on

Page 8.

Minor comments:

The term "asymmetric" when applied for a current sheet usually means that the plasma and magnetic field conditions are different at two sides of the current sheet, e.g., the magnetopause current sheet. The authors may want to use "curved current sheet" instead, or simply avoid "asymmetric".

Throughout the paper, please, choose the same sequence for Harris, Kan, Fadeev and Manankova when describing the family of solutions.

Page 1, Line 16: What is meant by "approximate" here?

Page 2, Lines 15-16: Please, split in two sentences.

Page 2, Lines 28-30: This should be in the abstract.

Page 3, Line 2: What is "current velocity"?

Page 3, Line 6: "typical length" of what?

Page 3, Lines 11-12, ", in general cannot be fulfilled" -> ", which is generally not fulfilled" or ", but is generally not fulfilled"? What is meant here?

Page 3, Line 24: What is "quasi-dipole"?

Page 4, Line 13: The tilt is φ or $\varphi/2$?

Page 4, Line 15: Where should one look at Figure 2 to understand the contribution of "a"?

Page 5, Line 5: Would "isothermal" be observed in nature too?

Page 5, Line 8: "stops at" -> "stop near" (overshoot may happen).

Page 5, Lines 15-16: why these (x,z) are chosen for S calculations?

Page 7, Line 14: Faddev->Fadeev.

Page 8, Line 16: Unclear to what "yielding" refers to.

Figure 1: Please add axis units. "PHI" in the figure and φ in the caption are different by a factor of 2 (also φ in the text on Page 4, Line 13). Which is the correct one?

Figure 2: Please add axis units.

Figure 7: Figure caption is unclear. Color coding is unclear. Please, add axis units.

Figure 8: Please add axis units.