Comment on gmd-2021-112

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Referee comment on "Modelling of faults in LoopStructural 1.0" by Lachlan Grose et al.,
Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-112-RC1, 2021

The manuscript presents a new methodology for implicit modeling in the presence of faults
that takes into account the fault kinematics. Points in space are translated in order to
reverse the effects of faulting prior to interpolation, imparting useful and desirable
properties to the interpolated model.

The article is very clear and well-written, and the results represent an important step
forward in implicit modeling. I have only a few questions and remarks:

Section 3 explains the methodology's core, so I believe it is important to include a figure
showing exatcly how f_0, f_1, and f_2 are measured and how the field data is encoded in order
to constrain their values (as scalars, displacement vectors, etc.).

When applying the displacement field, is there any risk of generating ''knots'', i.e. of a
point landing on top of another or past it? In other words, is the relative ordering of the
points always maintained?

It seems it is necessary to label the faults according to their relative age. What if this
information is not available?

Section 4.1: if the coordinates are interpolated sequentially, wouldn't it be possbible to
obtain coordinate 2 directly from the cross-product $\square f_0 \times \square f_1$?

In Figure 8B the fault displacement vectors appear only on one side of the fault, while in
6A they appear in both sides. Is this correct?

Minor remarks:

Line 161: small typo in ''includes''.
Line 258: small typo in ''frame is coordinates''.
Line 352: ''The resulting 3D displacement scalar field is shown in Fig. 6A''. Do you mean 6B?
Line 364: check ''in the reverse''.
Line 408: check ''the absense of a no hole effect''.
Figure 10 does not seem to be referenced in the text. Also, are the titles in A and B supposed to be the same?