

Magn. Reson. Discuss., community comment CC1
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Comment on mr-2021-34

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Community comment on "Magnetostatic reciprocity for MR magnet design" by Pedro Freire Silva et al., Magn. Reson. Discuss., <https://doi.org/10.5194/mr-2021-34-CC1>, 2021

I agree with the comments of the referee. I have a pretty good background in magnetostatics and I am having trouble following the exposition. In the very first paragraph, it would help if the volumes of interest are clearly labeled and delineated with their respective boundaries. Furthermore, the first paragraph mentions a **vector potential** A and the field H_A . So, is H_A the curl of A ? The magnetization M produces a field H_M . But a magnetization source produces a B field and an H field, so which one is it? Certainly if M is zero within the volume of interest, they are identical.

This reciprocity theorem appears to be related to those associated with the Helmholtz decomposition, for example the one where the volume integral of $B \cdot H$ is zero when $\text{div} H = 0$ and $\text{curl} B = 0$. Is this the correct origin? It would help to give at least some short exposition rather than just a quote from Sir James Jean's 1908 manuscript, or better yet, a modern text with modern notation.

The submission mentions superposition in many places. For large magnetizations, this holds if the magnetization is saturated or strongly frozen in place. This is the gospel according to Jackson as I understand it. Some comments about this, or at least a reference where one can get a fuller explanation would be helpful. Certainly superposition is the usual manner in which array magnetics are constructed. Are the limitations of superposition being addressed here? It is not clear.