

Magn. Reson. Discuss., community comment CC4 https://doi.org/10.5194/mr-2021-65-CC4, 2022 © Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.

Reply on AC1

Tom Barbara

Community comment on "Radiation damping strongly perturbs remote resonances in the presence of homonuclear mixing" by Philippe Pelupessy, Magn. Reson. Discuss., https://doi.org/10.5194/mr-2021-65-CC4, 2022

I checked out is consequences of the extra terms proportional to cos(psi) and sin(psi) to the stereographic projection method and to my surprise is gives a term in i*Mz*zeta where zeta is the complex Ricatti variable. This is quite ugly and spoils the entire program of making the transformation. Another surprise! I am not aware of anyone pointing this out before. So these linearization schemes are very limited in practice.

I really should not have been surprised, because after I worked out the stereographic projection I tried to apply this to inhomogeneous broadened lines. It was definitely not worth the effort and so I gave up on it and used Runge-Kutta on an esembly of 10 spins. Never published that, or the case when saturating a line. The steady state equation is a cubic, and I searched for the case where one would get three real roots and see if one got chaotic behavior. I saw some strange things, but it also just seemed to be a special case that would never be realized in an experiment.