

عنوان مقاله:

Superiority of the 3rd Order Approximation Model to the 2nd Order in Diffusion Kurtosis Imaging

محل انتشار:

نوزدهمین کنفرانس مهندسی برق ایران (سال: 1390)

تعداد صفحات اصل مقاله: 6

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خلاصه مقاله:

For estimating the kurtosis parameter in Diffusion Kurtosis Imaging (DKI), usually second order expansion of the diffusion signal is used in conventional acquisition data. However, in this work, we show that this is not sufficient and should be reconsidered. Instead of using the second order expansion, we propose to use the third order expansion. At first, we show that the third order term of the Taylor's expansion has considerable values compared to second and first terms for the conventional b-values used in DKI. Then, for proving our claim empirically, we use real data to compare the proposed model with the previous one. To this end, five regions of the brain are extracted and for each region the fitting errors of both models are computed. The results confirm that the fitting error of the third order model is always (for all regions) less than the second order model. Although the improvement of the fitting error seems to be small, but considering the sensitivity analysis, this improvement can enhance the estimation of kurtosis. The resulting maps of the kurtosis parameter show this enhancement. The white matter in the map of third order model is more distinguishable than in the other model.

کلمات کلیدی:

Diffusion Kurtosis Imaging (DKI), Diffusion, MRI, Brain, Non-Gaussian

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