Dimensional splitting of hyperbolic partial differential equations using the Radon transform

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We introduce a dimensional splitting method based on the intertwining property of the Radon transform, with a particular focus on its applications related to hyperbolic partial differential equations (PDEs). It is a natural generalization of the translational representation of Lax–Philips [Lax and Phillips, Bull. Amer. Math. Soc. 70 (1964), no. 1, 130–142]. This dimensional splitting has remarkable properties that makes it useful in a variety of contexts, including multi–dimensional extension of large time–step (LTS) methods, absorbing boundary conditions, and displacement interpolation.