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Separation of multiple scatterers in NEWS-TR experiments

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Nonlinear elastic wave spectroscopy combined with acoustic time reversal (NEWS-TR) is a promising new methodology for detecting microdamage at an early stage. When dealing with structures which could potentially contain many point-like nonlinear scatterers, there is a need to develop techniques for separately imaging the defects using a distributed sensor network which acts as a time-reversal mirror. In this contribution, we present numerical simulations of a newly developed version of the DORT method for nonlinear imaging and also discuss the possibility of applying PARAFAC (Parallel Factor Analysis) and ICA (Independent Component Analysis) methods to solve the problem of separating multiple nonlinear scatterers in the time-frequency domain.