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Petronela Radu* (pradu@unl.edu). *Convergence and decompositions for nonlocal operators.*

The emergence of nonlocal theories as successful models for studying phenomena and behaviors in different areas of science (continuum mechanics, biology, image processing) has led the mathematical community to introduce and conduct investigations of integral operators and associated systems of equations. In this talk I will present some recent results on nonlocal frameworks systems based on some existing, as well as newly introduced, nonlocal operators. An in-depth study of properties of the operators includes a series of results on nonlocal versions of integration by parts theorems, Helmholtz-Hodge type decompositions, as well as convergence of operators to their classical equivalents as the interaction horizon vanishes. (Received August 17, 2021)