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Petronela Radu, Daniel Toundykov and Jeremy Trageser* (jtrageser@gwu.edu). *A fourth-order nonlocal operator and its connection with the local counterpart.*

This talk will discuss a nonlocal operator as a natural generalization to the biharmonic operator that arises in thin-plate theory. The operator is built in the nonlocal calculus framework and connects with the recent theory of peridynamics. This framework enables us to consider non-smooth approximations to fourth-order elliptic boundary value problems. For these systems we will introduce nonlocal formulations of the clamped and hinged boundary conditions that are well-defined even for irregular domains. Results on well-posedness of these nonlocal problems and regularity of the operator will be given. Lastly, a proof outline will be provided which demonstrates that when the interaction horizon goes to zero, solutions of the nonlocal problems convergence strongly in L^2 to functions in $W^{1,2}$. For regular domains we identify these limits as the weak solutions of the corresponding classical elliptic boundary value problems. (Received September 19, 2015)