**Meeting:** 1005, Newark, Delaware, SS 13A, Special Session on Integral and Operator Equations

1005-35-160 **Richard J. Weinacht*** (weinacht@math.udel.edu). *A Helmholtz/Weyl decomposition theorem in energy space with applications.* Preliminary report.

Let H be the Hilbert space consisting of elements of the n-vector Sobolev space of order one with vanishing traces on the boundary of a bounded region D in n-space (n>1) and with inner product defined via the energy norm of non-homogeneous (isotropic or anisotropic) elasticity. By means of Green's operators we give an orthogonal decomposition of H. For special values of the parameters in the homogeneous isotropic case our result reduces to one of V. Girault and P.A. Raviart [ Finite Element Approximation of the Navier-Stokes Equations, Lecture Notes in Mathematics, Vol. 749 ,Springer Verlag (1979)]. An indication is given of application of the decomposition to thermoelasticity and heat-conducting fluids. (Received February 07, 2005)