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Paul Frank Baum* (pxb6@psu.edu), Mathematics Department, McAllister Building, Penn State University, University Park, PA 16802. *Beyond Ellipticity*.

This talk applies K-homology to solve the index problem for a class of hypoelliptic (but not elliptic) differential operators on contact manifolds. K-homology is the dual theory to K-theory. An explicit formula will be given for the K-cycle (i.e., the element in geometric K-homology) determined by certain Fredholm differential operators in the Heisenberg calculus. The index theorem of this talk indicates how the analytic versus geometric K-homology setting provides an effective framework for extending formulas of Atiyah–Singer type to non-elliptic Fredholm operators. Given an index problem, the K-homology framework provides a guide and hint as to what the solution of that index problem might be. The above is joint work with Erik van Erp. (Received September 16, 2016)