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The HOL Light formalization of Euclidean space.

Over the last few years, we and others have been developing a fairly large library of formalized theorems about Euclidean space in the HOL Light theorem prover. This includes basic properties of vectors, linear algebra, topological notions, some results on convex sets in general and polytopes and polyhedra in particular, Frechet derivatives, measure and (gauge) integration, and geometrical notions. A supplementary library uses this background to develop complex analysis including a version of Cauchy's theorem, and this has been applied to formalize an analytic proof of the Prime Number Theorem. The library as a whole provides the basic background for the Flyspeck project to formalize the proof of the Kepler conjecture, and some parts have been developed explicitly to support this effort. I will present some of the highlights of this work. (Received September 21, 2010)