Synthetic Differential Geometry

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This is the first exposition of a synthetic method of reasoning in differential geometry and differential calculus, based on the assumption of sufficiently many nilpotent elements on the real line. The use of nilpotent elements allows one to replace the limit processes of analytic differential geometry and calculus by purely algebraic calculations. In the long run this feature may make those topics accessible at an earlier stage.

The use of nilpotent elements in geometry was advocated by Grothendieck but only when Lawvere, in 1967, studied them using categorical logic did their use become natural and intuitive.

Dr Kock assumes some knowledge of calculus and abstract algebra and familiarity with the basic notions of category theory. The graduate student or professional interested in algebraic or differential geometry, or category theory will find this book most useful, either as a textbook (there are numerous exercises) or as a reference book.

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