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(*b.* Nieuweramstel [now part of Amsterdam], Netherlands, 28 August 1883; *d.* Epe, Netherlands, 20 January 1971)

*tensor analysis.*

A descendant of a prominent family of shipbuilders, Schouten grew up in comfortable surroundings. He became not only one of the founders of the “Ricci calculus” but also an efficient organizer (he was a founder of the Mathematical Center at Amsterdam in 1946) and an astute investor. A meticulous lecturer and painfully accurate author he instilled the same standards in his pupils.

After studying [electrical engineering](#) at what is now the Technische Hogeschool at Delft, Schouten practiced this profession for a few years and then practiced this profession for a few years and then returned to study in Leiden when an inheritance gave him the necessary independence. Upon completion of his doctoral dissertation in 1914, his first contribution to the foundations of tensor analysis, he was appointed professor at Delft. In 1943 Schouten resigned the post, divorced his wife, and remarried. From then on, he lived in semiseclusion at Epe. Although he was a professor at the University of Amsterdam from 1948 to 1953, the Mathematical Center had replaced teaching as his first commitment. He served the Center until 1968 and was its director for about five years.

Schouten attained numerous distinctions during his lifetime, including membership in the Royal Netherlands Academy of Sciences, the rotating position of *rector magnificus* at Delft, the presidency of the 1954 International Congress of Mathematicians at Amsterdam, several terms as president of the Wiskundig Genootschap (the society of Netherlands mathematicians), and a royal decoration.

Schouten’s scientific contributions comprise some 180 papers and six books, virtually all related to tensor analysis and its applications to differential geometry. Lie groups, relativity, unified field theory, and Pfaffian systems of differential equations. Having entered the field when it was in its infancy, he helped develop and perfect the basic techniques of local differential geometry and applied them in numerous ways. He discovered connections (“geodesic displacements”) in Riemannian manifolds in 1919, independently of, although later than, Levi-Civita; and he also discovered basic properties of Kähler manifolds in 1931, two years before Kähler. Under the influence of Weyl and Eddington he was led to general linear connections and investigated affine, projective, and conformal manifolds.

Schouten’s approach to differential geometry was strongly influenced by [Felix Klein](#)’s “Erlanger Programm” (1872), which viewed each geometry as the theory of invariants of a particular group. This approach led him to point of view that handled geometric problems more formally than most other prominent differential geometers of his time, notably Levi-Civita, E. Cartan, Veblen, Eisenhart, and Blaschke. This same point of view underlies his “Kernel-index method,” a notation of great precision, which he and his pupils used masterfully, but which gained favor elsewhere only in less extreme forms.

Schouten inspired numerous co-workers, including D. J. Struik, D. van Dantzig, J. HAantjes, E. R. van Kampen, V. Hlavaty, S. Golab, Kentaro Yano, E. J. Post, and A. Nijenhuis. His influence extended as far as Russia and Japan.

## BIBLIOGRAPHY

I. Original Works. Most of Schouten’s work on tensor analysis and differential geometry can be found or is referred to in *Der Ricci Kalkül* (Berlin, 1924): *Einführung in die neueren Methoden der Differential geometrie* 2 vols. (Groningen, 1934–1938), **I**, *Uebertragungslehre* by Schouten, **II**, *Geometrie*, by D. J. Struik, also translated into Russian (Moscow, 1939, 1948); and *Pfaffs and Its Generalisations* (Oxford, 1948). Written with W. van der Kulk *Ricci Calculus* (Berlin, 1954), the 2nd ed. Of *Der Ricci Kalkül*, is completely rewritten and contains all that Schouten considered relevant in differential geometry at the end of his career. *Tensor Analysis for Physicists* (Oxford, 1951) is an attempt to spread to sophisticated physicists the subtleties of tensor analysis and its implications for field theory and elasticity.

A collection of Schouten’s papers and correspondence has been deposited at the library of the Mathematical Center in Amsterdam.

II. Secondary Literature. A short biographical article, concentrating on Schouten's scientific work, is D. J. Struik's *Levensbericht* on Schouten, in *Jaarboekder K. Nederlandsche akademie van wetenschappen* for 1971, pp. 94–100, with portrait. A. Nijenhuis, "J. A. Schouten: A Master at Tensors," in *Nieuw archief voor wiskunde*, 3rd ser., **20** (1972), 1–19. contains a complete list of publications.

Albert Nijenhuis