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(*b*. Pisa, Italy, 14 November 1845; *d*. Pisa, 28 October 1918)

mathematics.

Dini, son of Pietro and Teresa Marchionneschi Dini, came from a very modest background. He studied first in his native city, where, at the age of nineteen, he defended a thesis on applicable surfaces. Having won a competitive examination for study abroad, he left the teachers' college founded by his teacher, Enrico Betti, and went to Paris, where he studied for a year under Joseph Bertrand and Charles Hermite. Seven of his publications on the theory of surfaces date from that brief period.

In 1866 Dini taught higher algebra and theoretical geodesy at the University of Pisa; in 1871 he succeeded Betti (who preferred to direct his efforts to mathematical physics) as professor of analysis and higher geometry and, as early as 1877, also taught infinitesimal analysis. He held these two professorships for the rest of his life. Rector of the university between 1888 and 1890 and director of the teachers' college from 1908 to 1918, Dini was also one of the founders of the School of Applied Engineering in Pisa and was its interim director.

From his youth Dini took an active role in public life; he was a member of the city council of Pisa in 1871 and in various other years until 1895. He was elected to the national parliament in 1880 as a deputy from Pisa and was reelected three times. In 1892 he was appointed a senator of the kingdom.

Dini was an upright, honest, kind man who divided his life between teaching and pure research, on the one hand, and the obligations of a public career completely devoted to the well-being of his native city and his country, on the other.

Two periods of equally intense production may be noted in Dini's scientific activity. The first dealt with infinitesimal geometry and centered on studies of the properties of certain surfaces undertaken by Liouville and Meusnier in France and by Beltrami in Italy. These include surfaces of which the product or the ratio of two principal radii of curvature remains constant (helicoid surfaces to which Dini's name has been given); ruled surfaces for which one of the principal radii of curvature is a function of the other; and the problem suggested by Beltrami, and solved in its entirety by Dini, of representing, point by point, one surface on another in such manner that the geodesic curves of one correspond to the geodesic curves of the other. Dini's complete study of the conformable representation of one surface on another resembles the differential parameters introduced by Beltrami and, generally speaking, equations with partial differential coefficients

Without losing sight of this geometric research, toward which he guided his best students (such as Luigi Bianchi), Dini preferred to devote himself, after 1871, to analytical studies, in which he was inspired by Weierstrass' and Mittag-Leffler's results on uniform functions and by Dirichlet's on series development of functions of a real variable. He discovered the properties of this development through application of an inversion formula more general than Abel's. Dini of course gave preference to the study of functions of a real variable; but his publication on uniform functions, in which he showed that Weierstrass' and Mittag-Leffler's formulas could be obtained through the method used by Betti in his theory of elliptic functions, proves that he was just as content to develop functions of a complex variable.

Dini devoted a volume to Fourier series and a long chapter of his *Lezioni di analisi infinitesimale* to integral equations, in which many original and fruitful ideas appear. Of his last works in mathematical analysis, the greatest number concern the integration of linear differential equations and equations with partial derivatives of the second order. It must also be mentioned that he discovered a method of solving the linear equation

$$a_o y^{(n)} + a_1 y^{(n-1)} + \ldots + a_n y = X,$$

in which the a's are given functions of x, X being a function of x. Dini also established a theorem for the upper and lower bounds for the moduli of the roots of an algebraic equation.

BIBLIOGRAPHY

I.Original Works. Dini's main writings are *Fondamenti per la teoria delle funzioni di variabili reali* (Pisa, 1878), trans, into German by J. Lüroth and A. Schepp as *Grundlagen für eine Theorie der Funktionen einer veränderlichen reellen Grösse* (Leipzig, 1892); *Serie di Fourier e altre rappresentazioni analitiche delle funzioni di una variabile reale* (Pisa, 1880); *Lezioni*

di analisi infinitesimale 2 vols.(Pisa, 1907–1915); and *Lezioni sulla teoria delle funzioni sferiche e delle funzioni di Bessel* (Pisa, 1912). There are articles by Dini in *Annali di matematica pura ed applicata, Atti della Reale Accademia dei Lincei, Comptes rendus hebdomadaires des séances de l'Académie des sciences, Giornale di matematiche*, and *Rentdiconti del circolo matematico di Palermo*. The work on uniform functions, "Alcuni teoremi sulle funzioni di una variabile complessa," is in *Collectanea mathematica in memoriam Dominici Chelini* (Milan, 1881), pp.258–276.

II.Secondary Literature. Gino Loria examined the life and works of Dini in "Gli scienziati italiani dall'inizio del medio evo ai nostri giorni," in *Repertorio... direttoda Aldo Mieli*, I, pt.1 (Rome, 1921), pp.137–150. This work includes a complete bibliography of Dini's works (62 titles), a reproduction of an autograph letter, and several details concerning his political activity. Luigi Bianchi, a student of Dini's, wrote "Commemorazione del socio Ulisse Dini," in *Atti della Reale Accademia dei Lincei*, **28** (1919), 154–163; and the article in the *Enciclopedia Treccani*, XII, 909. See also W. B. Ford, "A Brief Account of the Life and Work of the Late Professor Ulisse Dini," in *Bulletin of the American Mathematical Society*, **26** (1920), 173–177.

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