Call For Nominations

IEEE Technical Field Award

Solicitations are made by the Kirchhoff Award Committee for nominations toward the IEEE Gustav Robert Kirchhoff Award as an IEEE Technical Field Award sponsored by the IEEE Circuits & Systems Society. The due date is January 31 of each year and the nomination form is available at http://www. ieee.org/ awards/sums/Kirchhoffsum.xmlWith the inauguration of the Award it is worth knowing more about Kirchhoff himself.

Every electrical engineer learns early of the two Kirchhoff laws, but not very many realize that they were published while he was still a student. The publication is {(vom Studiosus) Kirchhoff, "Ueber den Durchgang eines elektrischen Stromes durch eine Ebene, insbesonere durch eine kreisförmige," [Mitglied des physikalischen Seminars zu Konigsberg] Annalen der Physik und Chemie, Vol. 64, No. 4, 1845, pp. 487 - 514}. In this the voltage law appears as an undisplayed equation at the top of page 502 and the current law is proven (and displayed) as part I of a theorem on page 513 of the same work. As he states in the first paragraph, the work is a continuation of that of Ohm. A portrait of Kirchhoff, taken from the cover of his collected works, is given in Figure 1.

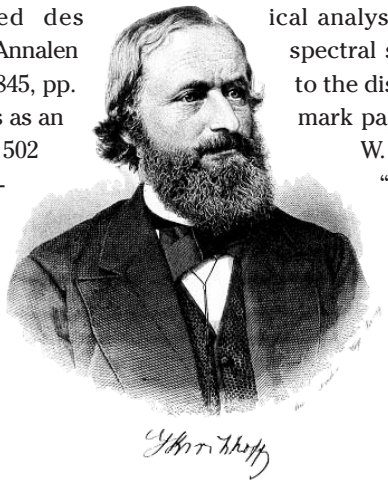

Figure 1. Portrait of Gustav Robert Kirchhoff

Kirchhoff's mother was Johanna Henriette Wittke and his father was the lawyer Friedrich Kirchhoff. His date of birth was March 24, 1824 in Königsberg, Prussia (now Kaliningrad, Russia) and he died in Berlin on October 17, 1887. He attended the Albertus University of Königsberg where he attended the Neumann-Jacobi mathematics-physics seminars from 1843 to 1846 for which his paper cited above was prepared while studying under Franz Neumann. In 1847 he married Clara Richelot (1834-1869) the daughter of one of his mathematics professors, Friedrich Richelot, and in 1872 he was married to Benovefa Karolina Sopie Luise Brömmel (he had two sons and two daughters). In 1847 he also received the Doctor of Philosophy from Königsberg University with the mathematician Ludwig Otto Hesse as his advisor (Hesse studied under Jacobi also at Königsberg, graduating in 1840, and is known to many of us through the Hessian). Kirchhoff's dissertation title is:

De criteriis quibus cognoscatur an aequatio quinti gradus irreductibilis algebraice resolvi posset / De parallaxi stellae Argelandriae [translation: On the criteria by which one solves a fifth degree irreducible algebraic equation / for the parallax of the stars of Argelander.]

Argelander was an astronomer who published, also in Latin but in Finland, in 1830 a catalog of the 560 brightest stars in the northern hemisphere [4] (amazingly followed in 1850 by the same type of study for 324,000 stars, a catalog apparently still used through the 1950's).

Although Kirchhoff is best known to electrical engineers for the two laws mentioned above, some of his other work is well known to the chemists since he gave the spectra of a number of elements leading to a chemical analysis via the spectrum. This led him to a spectral study of the sun from which he was led to the discovery of Cesium and Rubidium. A landmark paper was his written in 1860 with Robert W. Bunsen using his apparatus, called the "spectroscope," to obtain spectra of chemicals. Apparently his use of it led to serious eye problems for Kirchhoff.

In 1847 Kirchhoff became an unsalaried lecturer (Privatdozent) at the University of Berlin with Bunsen joining as Professor of Chemistry in 1850 and where Heinrich Hertz was one of his students. Then, during 1850-1854, Kirchhoff taught as extraordinary professor at the University of Breslau (now Warsaw) and in 1854, following Bunsen's appointment in Heidelberg, he became a Professor in Heidelberg where he pursued investigations on the emission and absorption of light leading to his ground breaking work with Bunsen. His work on black body radiation is considered fundamental to the development of quantum mechanics. In 1875 he went to Berlin as Professor for mathematical physics where he had a disability requiring him to spend much of his time on crutches or in a wheel chair and leading to his early retirement in 1886. His lectures are assembled in the four volume work of 1876-94, "Lectures in Mathematical Physics." At least two German stamps have been issued in his honor. He graduated five doctoral students including Max Noether who in turn graduated 19 doctorates. A few more details with references can be found at www.ieee.org/awards/sums/kirchhoffsum.xml.

G. KIRCHHOFF, "GESAMMELTE ABHANDLUNGEN, MIT PORTRAIT UND ZWEI LITHOGRAPHIRTEN TAFELN" JOHANN AMBROSIUS BARTH, LEIPZIG, 1882. THE PORTRAIT IS ON THE FRONT PAGE FACING THE TITLE PAGE.