

The figure and the work of Riccardo Felici

In the 200° anniversary of his birth

Paolo Rossi

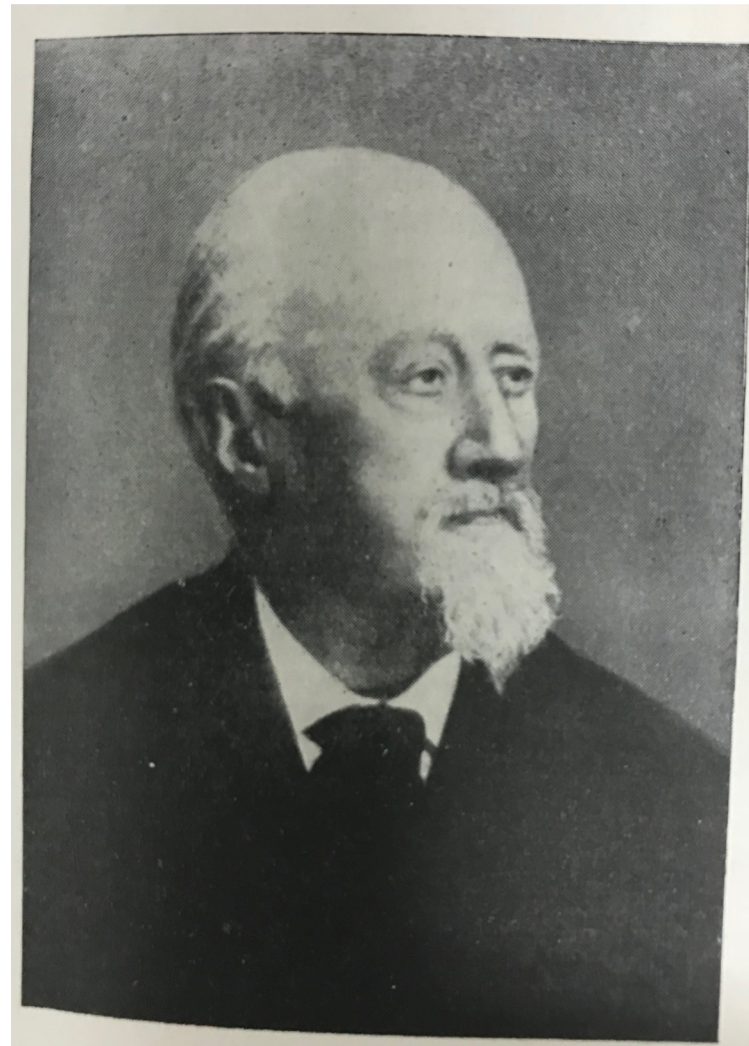
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Riccardo Felici (1819-1902)



A short biography

- June 11, 1819 Birth in Parma (?) or Pisa
- 1839 Enrollment in Pisa University
- 1843 Degree in Mathematics and Physics
- 1846 Assistant of Matteucci (Experimental Physics Chair)
- 1848 Lieutenant in the University Battalion (Curtatone)
- 1854 Adjunct Professor – Married to Elisa Frullini
- 1856 Birth of Isabella, his only child
- 1859 Full Professor of Experimental Physics in Pisa
- 1893 Retired – Professor Emeritus
- 1897 Cofounder of Italian Physical Society (SIF)
- July 20, 1902 Death in Sant'Alessio (LU)

Beginning of scientific activity

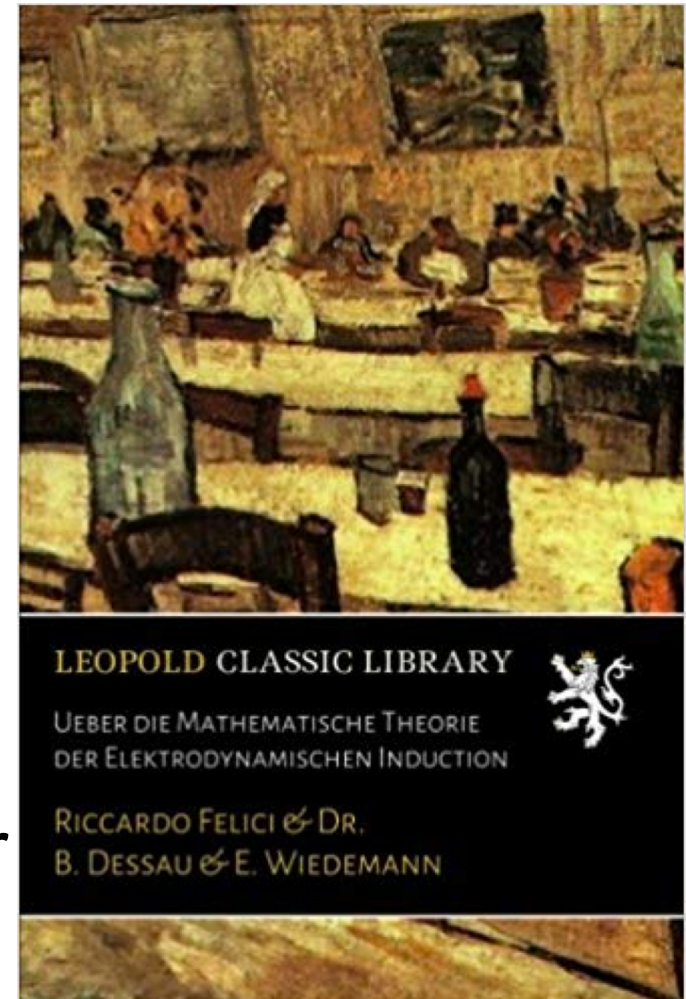
- 1844 Observations on a paper by H. Dutochet
- 1846 Thermoelectricity of mercury
- 1847 Electrical circuits formed by galvanic elements
- 1850 Propagation of electric current inside a spherical conductor
- 1851 Thermal effects on electrical conduction in liquids

Study of electromagnetic induction

- Sulla teoria matematica dell'induzione elettro-dinamica (three papers: 1851-1854)
- First quantitative verification of the laws of induction:

Acknowledged by J.C. Maxwell

Published in Ostwald's *Klassiker*



The (experimental) results

- Induced e.m.f. proportional to inducing current
- Induction by n currents i/n same as induction by single current i
- Conductor's effects same as sum of effects by its elementary currents
- Induced e.m.f. proportional to N . of coils and N' . of induced circuits
- Current in moving induced circuit = difference of currents induced in open circuit when closed in original or final positions
- Mutual induction of circular circuits proportional to their diameter
- Current induced from a solenoid depending only on relative position of circuit's and solenoid's extremities
- If axis of solenoid is closed loop no induction unless the circuit is concatenated with axis

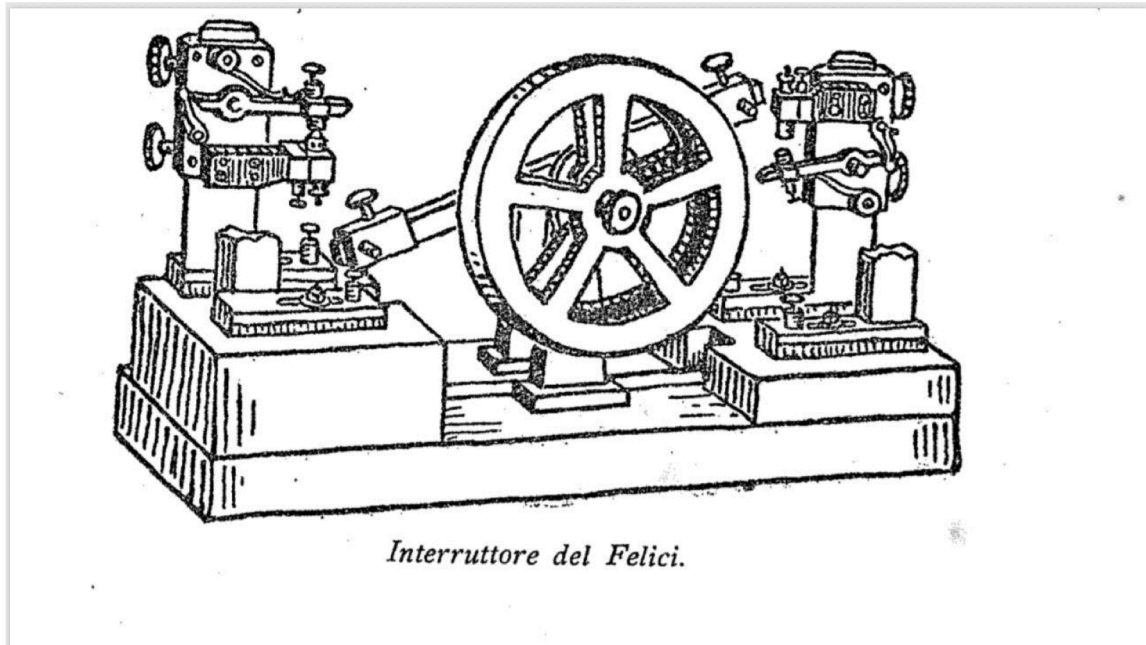
Felici's Law

- “It is possible to calculate the total charge that passes in a circuit subject to an induced current as the difference between the final flux of the magnetic field and the initial one divided by the electrical resistance of the circuit”:

$$\Delta Q = \Delta \Phi / R$$

Further scientific activity

- 1859 A model for diamagnetism
 - 1862 Speed of propagation of electricity
 - 1866 Shape of surfaces modeled by capillarity forces
 - 1870 Effects of electricity on dielectrics
 - 1874 Felici's switch
-
- Further research on electromagnetism until 1888



The first italian school of physics

- More than forty graduates. Many future university professors:
- Emilio Villari (1836-1904) Padua 1871-89 Napoli 1889-1904
- Antonio Pacinotti (1841-1912) Cagliari 1873-1881 Pisa 1881-1912
- Antonio Roiti (1843-1921) Palermo 1878-80 Firenze 1880-1913
- Ernesto Padova (1845-1896) Pisa 1872-81 Padua 1882-1896
- Luigi Donati (1846-1932) Bologna 1877-1921
- Giuseppe Poloni (1851-1887) Modena 1885-1887
- Adolfo Bartoli (1851-1896) Catania 1886-93 Pavia 1893-96
- Giuseppe Bongiovanni (1851-1918) Ferrara 1885-1918
- Oreste Murani (1853-1927) Milan 1899-1928
- Vito Volterra (1860-1940) Pisa 1887-93 Turin 1893-1900 Rome 1900-31
- Enr. Salvioni (1863-1936) Perugia 1892-98 Messina 1898-04 Pavia 1904-23
- Adolfo Campetti (1866-1947) Catania 1922-29 Pavia 1929-1936

A modest man



Pisa, Camposanto Monumentale

Iscrizione su pietra tombale di Riccardo Felici