Summary in English

Loren D. Olson, *Abelprisen 2010 - John Tate.* (Norwegian).

In connection with the awarding of the Abel Prize to John Tate, a short presentation of his work is presented along with some personal reminiscences of Tate by the author. The emphasis is put on Tate's work on elliptic curves, especially what relates to Tate-Shafarevic groups, L-series and their connections to Mordell-Weil and the Birch/Swinnerton-Dyer conjecture.

L. Gårding and P-A. Ivert, *Antalet egenvärden under en stor gräns* (Swedish)

The purpose is to give an elementary heuristic proof of a formula for the number of eigenvalues of a vibrating membrane in $\mathbf{R}^\mathbf{n}$ described by an elliptic linear differential equation. The formula, that goes back to Herman Weyl and has been developed further by Courant, Carleman and Hörmander, says that asymptotically the number $N(\lambda)$ of eigenvalues below λ is given by

$$(2\pi)^{-n} \iint_{x \in B p(x,\xi) < \lambda} dx d\xi$$

where B is the region formed by the membrane and $p(x, \xi)$ is the characteristic equation of the principal part of the relevant differential operator. The key idea (going back to Weyl and known as maximum-minimum principle) is to consider the energy of the vibrating membranes, which can be expressed as a quadratic form $E(u, u)$ of the derivatives of u and consider the successive minima of the quotients $E(u, u)/(u, u)$ on decreasing sequences of closed subspaces defined inductively and giving rise to the eigenfunctions. More precisely the successive minima will constitute the eigenvalues, and the decreasing sequence of closed subspaces will be formed by the orthogonal complements to the increasing sequences of subspaces spanned by the eigenvectors.

The argument is carried through for operators with constant coefficients, and the general case is indicated by some handwaving.

John K. Dagsvik, *Elliptiske Integraler I*(Norwegian).

The aim of the article is to give an elementary proof of Abel's generalization of additions theorems for elliptic integrals. In addition an elementary discussion of the preceding achievements of especially Euler, Legendre (the first to study such integrals systematically) and Lagrange is presented. This involves recalling standard examples of elliptic integrals such as the computation of arc-lengths of ellipses and lemniscates as well as calculating the period of a pendulum.