known recursion relationships, and checking by a neat formula given in Jordan's *Calculus of finite differences*) and then multiplying by $m!/s!$. The numbers $B_{m,s}$ are expressed in lowest terms. (Received April 20, 1944.)

190. Seymour Sherman, J. DiPaola, and H. F. Frissel: *Routh's discrimant, flutter, and ground resonance.* Preliminary report.

Routh's criterion for the stability of the solutions of system of linear differential equations with constant coefficients is extended to cover cases arising in airplane flutter and helicopter ground resonance calculations. With this new tool, the stability of the flutter "polynomial" at a given reduced frequency for more than two degrees of freedom can be determined in one-fifth of the time hitherto required. (Received May 29, 1944.)

Geometry

191. Edward Kasner and John DeCicco: *Isothermal families in general curvilinear coordinates, and loxodromes.*

If the square of the linear element of a surface Σ is given in isothermal coordinates (x, y) by $ds^2=E(x, y)(dx^2+dy^2)$, then the family of curves $g(x, y)=\text{const.}$ on Σ is isothermal if and only if $(\partial^2/\partial x^2+\partial^2/\partial y^2)$ arc tan $g_y/g_x=0$. In the present paper, the authors obtain the necessary and sufficient condition that $g(x, y)=\text{const.}$ represent an isothermal family when (x, y) are general curvilinear coordinates. This gives a large extension of Lie's theorem. The condition is simpler when the parametric curves form an orthogonal net. As an application, the condition is obtained that $g(x, y)=\text{const.}$ represent an isothermal family upon the Cartesian surface $z=f(x, y)$. Finally the condition is found that the level curves of the surface be an isothermal family. This is applied to the mapping of loxodromes, showing that they can be represented by straight lines for a sphere (Mercator) and spheroid (Lambert), but not for an ellipsoid of three unequal axes. Use is made of Kasner's theorem in Math. Ann. (1904). (Received April 20, 1944.)

192. Abraham Seidenberg: *Valuation ideals in polynomial rings.*

A constructive study of the valuation ideals in a polynomial ring $\mathfrak{O}=K[x, y]$ in two indeterminates, where K is an algebraically closed (ground-) field, is made. Let $\mathfrak{q}_1, \mathfrak{q}_2, \cdots$ be the Jordan sequence of v-ideals belonging to a valuation B of Σ/K, where Σ is the quotient field of $\mathfrak{O}$, and let $\mathfrak{q}_{i_j}$ be the jth ideal such that $v(\mathfrak{q}_{i_j})$ is not in the additive group generated by $v(\mathfrak{q}_1), \cdots, v(\mathfrak{q}_{i_j-1})$. A tool corresponding to the Puiseux series expansion for a valuation, which is available if K is of characteristic 0 but not in general, is found in introducing certain polynomials f_{i_j} such that $v(f_{i_j})=v(\mathfrak{q}_{i_j})$. Considerations are reduced to valuations of rational rank 2. If B is of rational rank 2, place $v(\mathfrak{q}_1)=1$ and let τ be the least irrational value assumed by elements of $\mathfrak{O}$. The description of the v-ideals in $\mathfrak{O}$ for B is intimately connected with the approximants and quasiapproximants to a certain integral multiple of τ. In particular, a simple 0-dimensional v-ideal $\mathfrak{q}_i$ is characterized in terms of the values of $\mathfrak{q}_i$ and $\mathfrak{q}_{i+1}$. This characterization yields a proof that the transform of a simple v-ideal under a quadratic transformation is simple. If $\mathfrak{q}_i$ is not simple, an explicit factorization of $\mathfrak{q}_i$ in terms of the mentioned values is given. (Received May 22, 1944.)

193. A. H. Wheeler: *One-sided polyhedra from the five regular solids.*