266. Hermann Weyl: *On Hodge's theory of harmonic integrals.*

Hodge's fundamental existence theorem for harmonic integrals on Riemannian manifolds of any dimensionality is proved by the parametrix method. (The proof incorporated in Hodge's recent book on *Harmonic Integrals*, Cambridge, 1941, is wrong.) (Received July 1, 1942.)

267. Hassler Whitney: *Differentiability of the remainder term in Taylor's formula.*

If $f(x)$ is of class C^m, and $1 \leqq n \leqq m$, then $f(x) = \sum_{i=0}^{n-1} f^{(i)}(0)x^i/i! + x^n f_n(x)/n!$. It is shown that $f_n(x)$ is of class C^{m-n}, but not necessarily of higher class, and $\lim_{x \to 0} x^k f^{(m-n+k)}(x) = 0$ $(k=1, \cdots, n)$. A converse is true. A similar theorem holds in more dimensions. (Received July 28, 1942.)

268. Hassler Whitney: *Note on differentiable even functions.*

It is shown that an even function $f(x)$ of class C^{2s} (or class C^∞, or analytic) may be written as $g(x^2)$, with g of class C^s (or class C^∞, or analytic). (Received July 28, 1942.)

269. Hassler Whitney: *The general type of singularity of a set of $2n-1$ smooth functions of n variables.*

Let f be a mapping of class C^1 of an n-manifold M^n into an M^{2n-1}. Then arbitrarily near f is a mapping f', regular except at isolated singular points; at each of these, a certain condition (C) holds. (C) involves first and second derivatives, but is independent of the coordinate system employed. If (C) holds at p, and the mapping is of class C^{4r+8} (or class C^∞, or analytic), then coordinate systems about p and $f(p)$, of class C^r (or class C^∞, or analytic), exist such that the mapping is exactly $y_1 = x_1^2$, $y_i = x_i$, $y_{n+i-1} = x_1 x_i$ $(i=2, \cdots, n)$. (Received July 28, 1942.)

Applied Mathematics

270. Stefan Bergman: *Operators in the theory of differential equations and their application.* I.

By introducing $u = x \cos\theta + y \sin\theta$, $v = -x \sin\theta + y \cos\theta$ and $\xi = (\sigma/2k) + \theta$, $\eta = (\sigma/2k) - \theta$, where $\sigma_x = \sigma + k \sin 2\theta$, $\sigma_y = \sigma - k \sin 2\theta$, $\tau_{xy} = -k \cos 2\theta$ the equations of the theory of plasticity can be written in the form $(\partial^2 u/\partial\xi\partial\eta) - u/4 = 0$, $(\partial^2 v/\partial\xi\partial\eta) - v/4 = 0$ (see Geiringer and Prager, Ergebnisse der exakten Naturwissenschaften, vol. 13, p. 350). Here σ_x, σ_y, τ_{xy} are stresses, x, y, cartesian coordinates. Particular solutions of these equations can be written in the form $u(\xi, \eta) = \int_{-1}^{1} \exp\,(t(\xi\eta)^{1/2}) \{ f[\xi(1-t^2)/2] + g[n(1-t^2)/2] \} (1-t^2)^{1/2} dt$ where f and g are arbitrary twice continuously differentiable functions of one variable. (See Duke Mathematical Journal, vol. 6 (1940), pp. 538 and 557.) This class of functions possesses a base $\{u_\nu(\xi, \eta)\}$ such that each u_ν satisfies two (simple) ordinary linear differential equations of second order with rational coefficients. Entire solutions u_ν of the above partial differential equation are such that every u defined in a convex domain can be approximated by sums of the form $\sum_{\nu=1}^{n} a_\nu^{(n)} u_\nu$. The author indicates an approximation procedure of a function u given by its boundary values. These functions u possess singularities which can be characterized in a way analogous to that in Comptes Rendus de l'Académie des Sciences, vol. 205 (1937), pp. 1360–1362. (Received June 3, 1942.)