duals; 2. Distributions and generalized functions; 3. The two-sided Laplace transformation; 4. The Mellin transformation; 5. The Hankel transformation; 8. The convolution transformation; 9. Transformations arising from orthogonal series.

The level of the book is that of the mature graduate student, though he would be greatly helped by some knowledge of the classical theory of integral transformations. While the book is primarily for mathematicians, almost all applied mathematicians could read it profitably, for there are many results for which they could find immediate use, and a number of illustrative applications are given.

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Formes différentielles. BY HENRI CARTAN. Hermann, Paris (1967). 188 pp.

This book belongs to the series edited newly by Professors H. Cartan, J. Dieudonné and J. P. Serre for the purpose of providing upper undergraduates with somewhat modern mathematics. Chapter I is devoted to characterize the notion of differential form of degree r, and it is defined to be a morphism ω; $U \to \mathscr{A}_r(E, F)$ where U is an open subset of Banach space and F another Banach space. After inquiring the condition for an element ω of differential forms $\Omega_r^{(n)}(U, F)$ to be exact by means of exterior derivation, the classical Frobenius theorem is proved in a refined fashion. Chapter II can rather be regarded as being subsidiary to what follows in Chapter III. Curvilinear integral and variation calculus are formulated in terms of $\Omega_r^{(n)}(U, F)$, $2 \geq r \geq 1$. Chapter III reveals the role that differential forms play in differential geometry by limiting the objectives to those on surfaces in E^3. The canonical 1-forms ω_i associated to the moving frame field and the connection forms ω_{ij} are shown to agree with all the definition and properties of Ω's stated in Chapter I. The formula of Gauss curvature is derived from the structure equations that are composed with ω_i and ω_{ij} with respect to the orthonormal frames, and by using the Green theorem so-called Gauss–Bonnet formula is presented. The readers will then know that $\Omega_r^{(n)}(U, F)$ serves to connect differential geometry with homology.

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Foundations of Differential Geometry, II. BY S. KOBAYASHI AND K. NOMIZU. Interscience Publication, Wiley, New York (1969).

This book is a continuation of Volume I of the authors' "Foundation of Differential Geometry". The chapter numbers continue from Volume I and the same notations are preserved whenever it is possible. The topic opens with Chapter

VII that gives the basic formulas and some certain classical theorems on geometry of an n-dimensional submanifold M immersed in an $(n+p)$-dimensional Riemannian manifold N, in particular R^{n+p}. In §§1 and 2 it is shown that the natural connections can always be induced on M from the canonical connections in the Stiefel manifolds $V(n, p)$ and $V(p, n)$, both over the Grassmann manifold $G(n, p)$, respectively, by means of the bundle maps associated to the generalized Gauss map of M into $G(n, p)$. After presenting the formalism of covariant differentiation, the classical formulas of Weingarten, Gauss and Codazzi are derived in §§3 and 4 and these are utilized to prove the generalized theorem of Tompkins due to Chern–Kuiper.

§§5, 6, and 7 are concerned with the classical notions and type numbers of hypersurfaces in a Euclidean space together with the Bonnet existence theorem. In the last paragraph the notions of auto-parallel submanifolds and totally geodesic submanifolds with affine connections are explained, and these two notions are proved to coincide with each other in the case that the enveloping space is of torsion free.

Chapter VIII is devoted to the differential geometry in the large viewed from geodesics, in other words, the variation calculus on geodesics. in §1 the definitions of Jacobi fields and conjugate points of a geodesic in a space of affine connection are given and in §2 these concepts are extended to metric spaces. After computing the first and second variation of the length integral, famous Rauch's theorem on the homeomorphism of a differentiable manifold with sphere is proved in §5 successfully while those topics on variation calculus in the large represented by "Morse index theorem" are illustrated in the remaining paragraphs lucidly.

Chapter IX gives the foundation an almost complex structure and Riemannian spaces admitting the structure, that is, an almost Hermitian spaces, all being given in the local sense. After giving purely algebraic preliminaries in §1, the integrability condition of the structure is discussed and the operators ∂ and $\bar{\partial}$ are introduced in §2 to the spaces that fulfil the above said condition, that is, complex spaces. Various examples of complex and almost complex manifolds are revealed in §§3, 4, and 5. The notion of holomorphic sectional curvature is seen in §7 and de Rham decomposition of a Kaehlerian manifold is in §8.

Chapter X is occupied by the discussion of invariant affine connections and invariant almost complex structure on homogeneous spaces, the majority of which is what the authors themselves had obtained in a decade of past years when the Tokyo school endeavoured to ramify the topics on infinitesimal invariant connections to the broad extent at that time.

In §1 the results of Wang in §11 of Chapter II are specialized to the situation where P is a K-invariant G-structure on a homogeneous space $M=K/H$ and its detailed consideration is given in §2. All other topics appearing in the remaining paragraphs serve as a basis for the Chapter XI. There the basic results in the theory of affine, Riemannian and Hermitian symmetric spaces are presented.

§§1 and 2 are devoted to explain a geometric motivation to the group-theoretic notion of symmetric spaces and it leads to the assignment of a canonical affine connection to G/H. The curvature form of such a connection is represented in an algebraic expression, through which one observes that the symmetric Lie algebra introduced in §3 is to a symmetric space what the Lie algebra is to a Lie group. Levi's theorem and the decomposition of a semi-simple Lie algebra into a direct sum of simple algebras are extended to the symmetric Lie algebra and its global version is given in §6. Symmetric spaces with complex structure are seen in §9. This chapter ends by showing that the classification of irreducible orthogonal symmetric Lie algebras is equivalent to that of real simple algebras if one assumes the Weyl existence theorem of a compact real form of a complex Lie algebra.

In Chapter XII is presented the geometric aspects of characteristic classes. §1 states Weil's result under the scheme due to Chern, while §2 introduces the algebra of Ad(G)-invariant polynomials in the Lie algebra G, the structure group of a principal fibre bundle. In §3 the so-called Chern class defined on a complex vector bundle is expressed in terms of the curvature form of a connection associated to the bundle, and in §4, using Hirzebruch's definition, the differential geometric formula for the Pontryagin class is presented. These lead to the general Gauss–Bonnet formula as the goal of the last chapter.

Thus the topics stated in this volume do not cover the more ramified area of differential geometry such as Finsler–Cartan–Berwald geometry, theory of tangent or cotangent bundles, or that of fibred spaces and almost tangent spaces. Nevertheless, the significance of this volume lies in the point that, as the title of the book plainly implies, it can provide all differential geometers of above graduate level with the solid foundation for all areas of research activity in differential geometry, since all the topics that are dealt with here are basic at this time of the century and are discussed thoroughly in the light of the subjects.

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Outline of General Topology. Par R. Engelking. Interscience Publication, Wiley, New York (1968). 388 pp.+erratum.

Disons tout de suite que derrière ce titre modeste se cache ce qui pourrait bien être le meilleur texte de topologie générale mis jusqu'à ce jour à la disposition des étudiants. Le niveau est celui de Kelley ou de Bourbaki. Le style toutefois est différent. Mentionnons quelques traits particulièrement plaisants: (1) Une étude complète d'exemples est incorporée dans le texte. Chaque nouvel exemple est assujetti à une application de tous les résultats appropriés vus jusqu'alors, et aussi confronté si nécessaire à d'autres exemples traités. (2) Une copieuse moisson d'exer-

https://doi.org/10.1017/S0008439500031829 Published online by Cambridge University Press