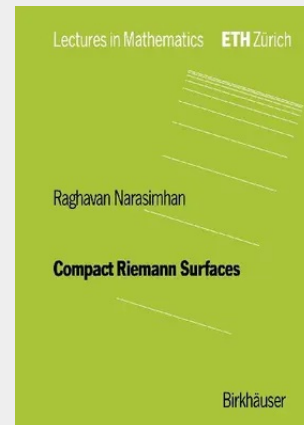


Compact Riemann Surfaces

These notes form the contents of a Nachdiplomvorlesung given at the Forschungs institut für Mathematik of the Eidgenössische Technische Hochschule, Zurich from November, 1984 to February, 1985. Prof. K. Chandrasekharan and Prof. Jürgen Moser have encouraged me to write them up for inclusion in the series, published by Birkhäuser, of notes of these courses at the ETH. Dr. Albert Stadler produced detailed notes of the first part of this course, and very intelligible class-room notes of the rest. Without this work of Dr. Stadler, these notes would not have been written. While I have changed some things (such as the proof of the Serre duality theorem, here done entirely in the spirit of Serre's original paper), the present notes follow Dr. Stadler's fairly closely. My original aim in giving the course was twofold. I wanted to present the basic theorems about the Jacobian from Riemann's own point of view. Given the Riemann-Roch theorem, if Riemann's methods are expressed in modern language, they differ very little (if at all) from the work of modern authors.

1. Algebraic functions.- 2. Riemann surfaces.- 3. The sheaf of germs of holomorphic functions.- 4. The Riemann surface of an algebraic function.- 5. Sheaves.- 6. Vector bundles, line bundles and divisors.- 7. Finiteness theorems.- 8. The Dolbeault isomorphism.- 9. Weyl's lemma and the Serre duality theorem.- 10. The Riemann-Roch theorem and some applications.- 11. Further properties of compact Riemann surfaces.- 12. Hyperelliptic curves and the canonical map.- 13. Some geometry of curves in projective space.- 14. Bilinear relations.- 15. The Jacobian and Abel's theorem.- 16. The Riemann theta function.- 17. The theta divisor.- 18. Torelli's theorem.- 19. Riemann's theorem on the singularities of ?.



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