Complex Analysis Syllabus

May 7, 2007

The syllabus for the qualifying exam in complex analysis may be divided into two main parts. Part I covers standard topics of a graduate course in complex analysis and corresponds roughly to MATH 425. Part II covers an agreed upon selection of topics building on Part I—see, e.g., Ahlfors, pp. 225–312; Hille, Vol. II; or Rudin, pp. 320–428.


2. The syllabus for this part may be drawn from some of the following topics, to name a few: Dirichlet’s problem; conformal mapping and conformal equivalence; analytic continuation and algebraic functions; Riemann surfaces; elliptic functions; discrete subgroups of the Möbius group; uniformization; metrics and curvature of complex domains; entire functions and Picard’s Theorem; boundary behavior and spaces of analytic functions on the disc. (This is a sample list of topics. Should this exam be offered in the future, the selection of topics in this part may be modified, for example depending on the coursework of a particular student.)

Primary Reference for Part I:

J. B. Conway, Functions of one complex variable, 2nd Edition: Chapters 1-5; Chapter 6 Sections 1, 2; Chapter 7, Sections 1, 2, 4; Chapter 10, Sections 1, 2.

Additional references:

L. V. Ahlfors, Complex Analysis, 3rd Edition
E. Hille, Analytic function theory, Volumes I, II, Ginn and Company
G. Jones and D. Singerman, Complex functions: an algebraic and geometric viewpoint, Cambridge Univ. Press.
S. Krantz, Complex analysis: the geometric viewpoint, MAA Carus Monograph.
Z. Nehari, Conformal mapping, Dover.
W. Rudin, Real and Complex Analysis, 3rd Edition