School of Mathematics

Module MA3424 — Topics in complex analysis II   2009-10
(JS & SS Mathematics, JS & SS Two-subject Moderatorship)

Lecturer: Dr. Dmitri Zaitsev

Requirements/prerequisites: prerequisite: MA3423

Duration: Hilary term, 10 weeks

Number of lectures per week: 3 lectures including tutorials per week

Assessment:

End-of-year Examination: This module will be examined jointly with MA3423 in a 3-hour examination in Trinity term, except that those taking just one of the two modules will have a 2 hour examination.

Description:
    Further detailed information about the course: `http://www.maths.tcd.ie/~zaitsev/ 342-2009-10/342.html`
    The argument principle. Rouché's theorem. Open mapping theorem. The univalence theorem (local injectivity criterion). Inverse function theorem.
    Spaces of holomorphic functions. Seminorms. Montel's theorem. Biholomphic maps between open sets. The Riemann mapping theorem.
    Möbius transformations. Riemann sphere (extended complex plane). Stereographic projection. Rationality of meromorphic functions on the Riemann sphere. Automorphisms of the Riemann sphere and the complex plane. Schwarz Lemma. Automorphisms of the disk. Cayley transform. Automorphisms of the upper half-plane. Homogeneity of the Riemann sphere, complex plane and disk.
    Schwarz Reflection Principle. Mittag-Leffler's theorem.
    Textbooks:

1. L. V. Ahlfors, Complex Analysis, Third Edition, McGraw-Hill, New York, 1978.

2. J. B. Conway, Functions of One Complex Variable, Second Edition, Graduate Texts in Mathematics 11, Springer-Verlag, New York, 1978.

3. R. Remmert, Theory of Complex Functions, Graduate Texts in Mathematics 122, Springer-Verlag, New York, 1991.

4. R. V. Churchill, J. W. Brown, Complex Variables and Applications, Fourth editio n. McGraw-Hill Book Co., New York, 1984.

5. B. P. Palka, An Introduction to Complex Function Theory, Undergraduate Texts in Mathematics. Springer-Verlag, New York, 1991.

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