MA203 Real Analysis

Course content

This is a course in real analysis for those who have already met the basic concepts of sequences and continuity on the real line. Here we generalize these concepts to Euclidean spaces and to more general metric and normed spaces. These more general spaces are introduced at the start and are emphasized throughout the course.

Topics covered are:

- Metric and normed spaces, open and closed sets.
- Sequences in metric spaces, compactness, completeness.
- Pointwise and uniform convergence of sequences of functions.
- Continuity of real valued functions and of functions between metric spaces, uniform continuity and Lipschitz condition.
- Differentiation of real valued functions, the mean value theorem, differentiation of functions between Euclidean spaces, and partial derivatives.
- Series, including power series and series in normed spaces.
- Riemann integral and the fundamental theorem of calculus.