ANALYSIS AND TOPOLOGY

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In 1872, Felix Klein made a famous speech [1] on geometry, whose content is known as *Erlangen program* in the history of Mathematics. One significance of this program is that a geometry is defined to be the study of invariant properties of geometric objects under a given transformation group. It had a great influence on the development of geometry and physics. In this course, we shall try to digest a big potion of this important document, that shall be learnt in a way accessible to modern language. Interesting enough, in §8.2 [1], entitled *Analysis situs*, Klein had foreseen the rising of a new kind of geometry-topology. Nowadays, topology has become a large topic of geometry, which has found spectacular applications in Physics as well as other branches of Science. Hence our course, centering around [1], has both old and new aspects of geometry. You may find some highlights of the course as below:

  (i) Hilbert's axiomatic approach to geometry;
 (ii) Motions of rigid bodies in E^3, classification of quadratic surfaces;
(iii) Transformation groups and geometries-Klein's point of view;
(iv) Plane projective geometry;
 (v) CW complexes and their fundamental groups/homology groups.

REFERENCES

[1] F. Klein, A comparative review of recent researches in geometry, Bull. New York Math. Soc. 2 (1892-1893), 215-249. Available online.