

The University of Western Ontario  
Department of Mathematics  
**Math 9607**  
**COMPLEX ANALYTIC GEOMETRY**

PRESENTATION TOPICS FOR WINTER 2019

## 1. One-dimensional analytic sets

- 1.1. Puiseux Theorem. [Chirka, Lojasiewicz]
- 1.2. Theorem on the tangent cone of a one-dimensional analytic set. [Chirka]

## 2. Proper mappings

- 2.1. Theorem on injective holomorphic maps  $f : \mathbb{C}^n \rightarrow \mathbb{C}^n$ . [d'Angelo]
- 2.2. Theorem on nonexistence of proper holomorphic maps from a polydisc to a ball. [d'Angelo]

## 3. Normalization

- 3.1. Notions of normal space and normal point of an analytic space. Algebraic characterisation of normality of a point (in terms of the local ring at the point). [Lojasiewicz]
- 3.2. Analyticity of the non-normal locus. [Lojasiewicz]
- 3.3. Theorem on the codimension of the singular locus of a normal space. [Lojasiewicz]
- 3.4. Existence of a local (and hence, global) normalization of a complex analytic space. [Lojasiewicz]

## 4. Analyticity vs. algebraicity

- 4.1. Chow Theorem on analytic sets in projective spaces. [Lojasiewicz]
- 4.2. Rudin Theorem on algebraicity of analytic sets. [Chirka, Lojasiewicz]
- 4.3. Chevalley Theorem on images of algebraically constructible sets. [Lojasiewicz]
- 4.4. Theorem on (global) analytic irreducibility of irreducible algebraic sets. [Lojasiewicz]

### Suggested sources:

1. E. M. Chirka, “Complex analytic sets”, 46. Kluwer Academic Publishers Group, Dordrecht, 1989.
2. J. P. d'Angelo, “Several complex variables and the geometry of real hypersurfaces”, CRC Press, Boca Raton, 1993.
3. S. Lojasiewicz, “Introduction to Complex Analytic Geometry”, Birkhäuser, Basel, 1991.