

ALGEBRA SEMINAR

**Title: Structure Theory of Birational Transforms**

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at Mathematical Science Building

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**Abstract:**

I focus on one open problem in the theory of global meromorphic functions - the rationality (= the generic parametrizability) criterion of compact manifolds/domains. After a quick review on 1-dimensional theory (Riemann surfaces), I explain a partial solution to the problem by Kobayashi-Ochiai (in any dimension) (and my own humble generalization to  $\text{char} = p > 0$ ). The difficulty of the original problem seems to have to do with our incomplete knowledge on the key underlying concept — birational/bimeromorphic equivalence. I introduce a new group functor  $SG_n$  with an action on the space  $\mathcal{S}_n$  of uniformizing parameters (roughly the set of regular local subrings of the universal coefficient ring  $HVR_n(k)$ ) which yields local birational transforms.

I emphasize that this last object is worthy enough to study in its own right. Indeed, as it turns out, it enables us to view the following two outstanding theories in algebraic geometry in one context, at least locally:

1. Hironaka's theory on resolution of singularities,
2. Cutkosky's theory on factoring birational mappings.