

## Sendai Logic Spring Workshop 2008 Program

### 20 Feb.

- 14:00-14:45 T. Sato  
Basic algebra in second order arithmetic
- 15:00-15:45 K. Yokoyama  
Formalizing non-standard arguments in second order arithmetic
- 16:00-17:00 K. Tadaki  
Equivalent characterizations of partial randomness for a recursively enumerable real

### 21 Feb.

- 10:30-11:15 Y.Horihata  
Complex analysis and Reverse mathematics
- 11:30-12:15 C. G. Liu  
TBA
- 12:15-14:00 lunch time
- 14:00-14:45 T. Nemoto  
Determinacy of Wadge classes and induction axioms of second order arithmetic
- 15:00-15:30 S. Yatabe  
On an arithmetic in a set theory within fuzzy logic
- 15:45-16:45 S. G. Simpson  
Recent Aspects of Mass Problems: Symbolic Dynamics and Intuitionism

## Abstracts (20 Feb.)

### **Basic algebra in second order arithmetic**

Takashi Sato, a joint work with K.Yokoyama and T.Yamazaki

We introduce some results on basic algebra in the context of Reverse Mathematics. For example, the existence of the center or the commutator subgroup of any countable group is equivalent to arithmetical comprehension axioms. Although this is already proved by R. Solomon, but we give a new proof.

### **Formalizing non-standard arguments in second order arithmetic**

Keita Yokoyama

We introduce the systems  $\text{ns-ACA}_0$  and  $\text{ns-WKL}_0$  of non-standard second order arithmetic in which we can formalize non-standard arguments in  $\text{ACA}_0$  and  $\text{WKL}_0$ , respectively. Then, we give some transformations from non-standard proofs in non-standard second order arithmetic into proofs in second order arithmetic.

### **Equivalent characterizations of partial randomness for a recursively enumerable real**

Kotaro Tadaki

We give several equivalent characterizations of partial randomness for a recursively enumerable real by generalizing the results on equivalent characterizations of randomness for a recursively enumerable real over the notion of partial randomness.

## Abstracts (21 Feb.)

### Complex analysis and Reverse mathematics

Yoshihiro Horihata, a joint work with K.Yokoyama

We study complex analysis in the context of weak subsystems of second order arithmetic. We are mainly concerned with integrability and singularities of holomorphic functions. Then, we develop a part of complex analysis concerned with Picard's little theorem. We show that Picard's little theorem is provable from  $WKL_0$  plus a version of the Riemann mapping theorem. Since a full version of the Riemann mapping theorem is provable in  $ACA_0$ , we can prove Picard's little theorem in  $ACA_0$ .

### Determinacy of Wadge classes and induction axioms of second order arithmetic

Takako Nemoto

In this talk, we treat determinacy of Wadge classes between  $\Sigma_1^0$  and  $\Delta_3^0$ . In particular, we focus on the relationship between determinacy statement and induction axioms. Main results are as follows:

1.  $\text{Bisep}(\Sigma_1^0, \Delta_1^0)$  is equivalent to weak König's lemma plus  $\Sigma_1^0$ -induction over  $RCA_0^*$ , where  $\text{Bisep}(\Sigma_1^0, \Delta_1^0)$  is the Wadge class just above  $\Sigma_1^0$ .
2.  $\text{Bisep}(\Sigma_2^0, \Delta_1^0)$  is equivalent to arithmetical transfinite recursion plus  $\Sigma_1^1$ -induction over  $RCA_0^*$ .

### On an arithmetic in a set theory within fuzzy logic

Shunsuke Yatabe

In  $H$ , a set theory with the comprehension principle within Lukasiewicz infinite-valued predicate logic, we prove that a statement which can be interpreted as "there is an infinite descending sequence of initial segments of  $\omega$ " is truth value 1 in any model of  $H$ , and we prove an analogy of Hájek's theorem with a very simple procedure.