Carlo Cellucci, *La filosofia della matematica del Novecento*, Laterza, Bari 2007

Philosophy of Mathematics in the Twentieth Century

Carlo Cellucci

1. *First order logic*

1.1. First order languages - 1.2. Axioms and rules for first order logic - 1.3. Models for first order languages - 1.4. Consistency - 1.5. Soundness and completeness - 1.6. Isomorphism of models - 1.7. First order theories

2. *Primitive recursive arithmetic*

2.1. Primitive recursive functions - 2.2. The theory **PRA** - 2.3. Some elemetary properties of **PRA** - 2.4. Sufficiently powerful theories

3. *Codification*

3.1. Gödel numbers - 3.2. RE-sets - 3.3. RE-theories - 3.4. Some useful primitive recursive functions

4. *The incompleteness theorems*

4.1. The fixed point theorem - 4.2. Gödel‘s first incompleteness theorem - 4.3. Corollaries of Gödel‘s first incompleteness theorem Gödel - 4.4. Gödel‘s second incompleteness theorem - 4.5. Relevance of the expression of consistency - 4.6. Rosser’s incompleteness theorem - 4.7. Gödel‘s third incompleteness theorem - 4.8. Comparison between Gödel‘s incompleteness theorems - 4.9. Extension to other theories

5. *Other limitative results*

5.1. Tarski’s undefinability theorems - 5.2. Undecidability theorem - 5.3. Church’s theorem - 5.4. Extension to other theories

6. *Second order theories*

6.1. Second order languages - 6.2. Azioms and rules for second order logic - 6.3. Models for second order languages - 6.4. Isomorphism of models - 6.5. Second order theories

7. *Second order Peano arithmetic*

7.1. The theory $\mathbf{PA}^2$ - 7.2. Gödel‘s incompleteness theorems for $\mathbf{PA}^2$ - 7.3. Other limitative results for $\mathbf{PA}^2$ - 7.4. Categoricity of $\mathbf{PA}^2$ - 7.5. Relation between recursive enumerability and arithmeticity - 7.6. Strong incompleteness of second order logic - 7.7. Non-arithmeticity of logical consequences of $\mathbf{PA}^2$ - 7.8. Weak models for second order languages - 7.9. Non-standard models of $\mathbf{PA}^2$

Guide to Further Readings

References

Index of Names