سمینار هفتگی منطق ریاضی
بهار ۹۶

How do Arithmetic Dynamic and Model Theory interact?   ۹۶٫۱٫۲۴

حامد خلیلیان
دانشگاه تربیت مدرس

Abstract

I will deliver a lecture with the ambitious goal of introducing some of the ideas at the Dynamic Mordell-Lang problem, especially how model theory plays a role in this area. An algebraic dynamical system is a variety X with a self-morphism $F : X \to X$. Difference equations are a natural tool for understanding such discrete dynamical systems. Several results in arithmetic dynamics have now been obtained through the model-theoretic thinking about difference equations. I will try to explain briefly the work of Medvedev-Scanlon on coordinate-wise polynomial dynamics.

A New Look at Some Fundamental Theorems   ۹۶٫۱٫۳۱

سعید صالحی پورمهر
دانشگاه تبریز

Abstract

In this talk we will have a new different, indeed a uniform and universal, look at the theorems of Tarski (on the undefinability of truth), Godel and Carnap (the diagonal lemma), Godel and Smullyan (incompleteness of definable arithmetical theories) and Kleene (the recursion or fixed-point theorem). We will investigate on the possibility of presenting alternative proofs for these theorems.

Provability Logic of Constructive Arithmetic   ۷و۱۴و۹۶٫۲٫۲۱

سید مجتبی مجتهدی
دانشگاه تهران

Abstract

Provability logic is a propositional modal logic in which the modal operator $\Box$ is interpreted as provability in some fixed theory and atomic variables are interpreted as arbitrary (or some restricted class of) sentences in the language of same theory. First in 1933, Kurt Gödel used some sort of provability interpretation motivated by the question of providing a classical semantics for intuitionistic logic. Since then, provability logic of many first-order theories characterized: the provability logic of PA and ZFC [Solovay 1976], relative provability logics and so on. In this series of talks, I will go through a complete proof of the decidability and arithmetical completeness of the modal logic iH^σ for arithmetical Σ_1-substitutions in HA. It's assumed that the audience is already familiar with elementary techniques from classical logic.

The Complexity of the Pigeonhole Principle   ۲٫۲۸ و ۹۶٫۳٫۴

عرفان خانیکی
دانشگاه صنعتی شریف

Abstract

In this talk, we will discuss Ajtai's work on proof complexity of pigeonhole principle. Ajtai proved that $I\Delta_0(f) \vdash PHP_n^{n+1}(f)$ where f is new unary function symbol and $PHP_n^{n+1}(f)$ means the statement that for every n, f is not a one-to-one function from restricted domain $\{0, 1, ..., n+1\}$ onto $\{0, 1, ..., n\}$. Ajtai proved this theorem by expanding a nonstandard model $M \models Th(\mathbb{N})$ to (M, f) using probabilistic methods and also ideas of Cohen's forcing. As a result, this proof implies that propositional translation of $PHP_n^{n+1}(f)$ does not have polynomial size constant-depth Frege proofs.

زمان: پنج شنبه‌ها ساعت ۱۴ الی ۱۶
مکان: میدان شهید باهنر، پژوهشگاه دانشهای بنیادی
سالن شماره ۱