SPECTRA OF $\mathcal{L}_{\omega_1,\omega}$ SENTENCES

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For a given theory T in a certain logic $\mathcal{L}$, the spectrum, spec(T), is the class of cardinals κ for which there is a model of T of cardinality κ. By Lowenheim-Skolem theorem for first order theories the only interesting question concerns finite cardinals. In this talk we will discuss the question of possible spectra for sentences in $\mathcal{L}_{\omega_1,\omega}$. This logic is obtain by closing the collection of atomic formulas under countable disjunctions, conjunctions and negation. The analysis of spec(φ) for an $\mathcal{L}_{\omega_1,\omega}$ sentence φ leads to very interesting questions at the intersection of set theory and model theory. In this talk we will give a survey of the known results and present a couple of new results in this area. At the end we will discuss some open problems.

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