▸ VALENTINA S. HARIZANOV, *Four notions of degree spectra.*

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In computable mathematics we are concerned with computability theoretic complexity of mathematical objects and constructions. Often, Turing and other degrees are used to measure such complexity, including how information can be encoded into the isomorphism type of a structure. We will give an overview of some earlier results and recent developments in our investigation of degree spectra of countable structures, degree spectra of relations on structures, and automorphism degree spectra, as well as degree spectra of spaces of orders on computable groups. The Turing degree spectrum of a countable structure $\mathcal{A}$ is the set of all Turing degrees of the atomic diagrams of the isomorphic copies of $\mathcal{A}$. The Turing degree spectrum of an additional relation R on a computable structure $\mathcal{B}$ is the set of Turing degrees of the images of R under all isomorphisms from $\mathcal{B}$ onto computable structures. While many degree spectra of relations have upper bounds under Turing reducibility, Knight proved that the degree spectrum of every automorphically nontrivial structure is closed upward in the Turing degrees. On the other hand, Turing degree spectra of relations relate to the degree spectra of structures via spectrally universal structures, which we studied with R. Miller, Csima, and Montalbán. The automorphism Turing degree spectrum of a computable structure is the set of Turing degrees of its nontrivial automorphisms. Together with R. Miller and Morozov, we obtained results which distinguish the automorphism degree spectrum from the previous two notions. Finally, we consider linear orderings of a fixed computable group $\mathcal{G}$, which are invariant under the group operations, and investigate the Turing degree spectrum of all such orders on $\mathcal{G}$. This is joint work with Dabkowska, Dabkowski, and Togha.