1163-03-307   **Russell Miller*** (`russell.miller@qc.cuny.edu`), Mathematics Dept., Queens College – CUNY, 65-30 Kissena Blvd., Flushing, NY 11355. *Computable structure theory with noncomputable structures.*

From its inception, computable model theory has used the notion of a computable structure: a structure with domain ω whose functions and relations can all be computed by Turing machines. This notion enables a logician to focus on the complexity of various aspects of these structures – new relations on them, isomorphisms between them, interpretations of one structure in another – without allowing distractions from complexities that could be baked into the structure.

We describe another approach: treat the atomic diagram of a structure as an oracle, via a Gödel coding. Even if the structure is not itself computable, one can then ask which aspects can be computed by a Turing functional endowed with such an oracle. On its face, this seems unlikely to yield results much different from those using traditional computable structures. Surprisingly, though, many properties that were quite complex under the traditional approach become far more tractable when oracles for noncomputable structures are considered this way. If anything, the presence of noncomputable structures makes life easier! We will provide several examples of this phenomenon, due to many researchers, illustrated to make them accessible even to logicians with no background in this area. (Received September 01, 2020)