1173-11-71 **Adam J Hammett*** (ahammett@cedarville.edu) and **Darrin D Frey** (freyd@cedarville.edu). *An Exhaustive Classification of Truncation-type Divisibility Tests.*

Have you ever wondered how certain divisibility tests were even happened upon? Every student of number theory has at one time or another been exposed to certain divisibility tests for small primes – for example, an integer is divisible by 3 if and only if the sum of its digits is divisible by 3 – but is there a way to generate these sorts of divisibility tests in a virtually automatic way? Even though divisibility tests are as old as number theory, it seems that an exhaustive analysis of so-called "block-truncation" divisibility algorithms, along with a way to construct them, is either not presented in a singular piece of number-theoretic literature or simply has not been tackled. In this talk we will present such an approach. Given an odd prime p different from 5, we show how one might go about "inventing" divisibility tests for p. The simple mechanism we provide makes clear that not just one, but infinitely many divisibility tests for p arise in this way. Our argument only rests on p being relatively prime to 10, and as such we may replace p by any positive integer m relatively prime to 10. Moreover, our analysis will prove to be exhaustive in the sense that there could not possibly be other block-truncation divisibility tests. Our results also extend to other bases. (Received September 14, 2021)