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Research and  
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RI 208



## Towards Artin's conjecture on $p$ -adic forms in low degree

Let  $F$  be a homogeneous polynomial of degree  $n$  in at least  $d^2 + 1$  variables over the  $p$ -adic numbers,  $\mathbb{Q}_p$ . Artin conjectured that such  $F$  always have nontrivial zeros in any  $p$ -adic field. Although this has been shown to be false in general, the conjecture is still widely believed to be true for prime degree forms. This conjecture holds for  $d=2$  and  $d=3$  due to Hasse and Lewis, respectively. By the work of Ax and Kochen, the conjecture is also known to hold whenever the characteristic of the residue field is sufficiently large. In this talk, we will explore recent progress for low degree forms towards making bounds on the size of the residue field effective. A wide range of techniques are needed, including Bertini theorems, point counting on curves over finite fields, and computation. This is joint work with Christopher Keyes.

Register in Advance for Zoom Link at:

<https://uregina-ca.zoom.us/meeting/register/ViXclwR-RfOtMRPljtPlzQ>



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