

Diophantine Equations and the Class Group

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Abstract: The task of finding integral solutions to Diophantine equations - polynomial equations involving several unknowns - is often simple, requiring only several moments of careful inspection. However, our familiar elementary techniques often fail as we encounter increasingly complex Diophantine equations. To find complete solutions to these more difficult problems, we must develop and harness more robust mathematical machinery. This talk will motivate, introduce, and exhibit several tools from ring and ideal theory which yield solutions to previously inaccessible Diophantine problems.

Prerequisites: Some abstract algebra (rings/fields)

References: Ian Stewart and David Tall, *Algebraic number theory and fermat's last theorem*, CRC Press, 2015.

Keith Conrad's Expository Notes, *Example of Mordell's Equation II*.

Paul Pollack, *A conversational introduction to algebraic number theory*, vol. 84, American Mathematical Soc., 2017.