

**THE CALGARY
MATHEMATICS
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LECTURES**

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THEORY REDUCTION, ALGEBRAIC NUMBER THEORY, AND THE COMPLEX PLANE

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How does mathematical knowledge grow? According to an influential formulation due to philosopher Ernest Nagel, when a scientific theory “reduces” another, the reduced theory is deductively subsumed under the reducing theory. Recent critics, using examples from physics, argue that Nagel’s criteria for theory reduction are both too strict, and too weak. Prof. Grosholz argues that theory reduction faces similar problems in mathematics. Certain proofs of Fermat’s conjectures, by means of the alliance of number theory with complex analysis, lead to the study of algebraic number fields, and class field theory. This ampliative extension of number theory is at once too strong and too weak to look like Nagelian theory reduction, which is just why it turns out to be so fruitful.

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