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# THE NOETHER THEOREMS: THEN AND NOW

Karen Uhlenbeck

University of Texas at Austin

## Abstract

The 1918 Noether theorems were a product of the general search for energy and momentum conservation in Einstein's newly formulated theory of general relativity. Although widely referred to as the connection between symmetry and conservation laws, the theorems themselves are often not understood properly and hence have not been as widely used as they might be. In the first part of the talk, I outline a brief history of the theorems, explain a bit of the language, translate the first theorem into coordinate invariant language and give a few examples. I will briefly mention their historical importance in physics and integrable systems. In the second part of the talk, I describe why they are still relevant: why George Daskalopoulos and I came to be interested in them for our investigation into the best Lipschitz maps of surfaces of Bill Thurston and the open problems in higher dimensions. I will finish by mentioning two recent papers, one in math and the other in physics, which greatly simplify the derivations of important identities by using the theorems.

**Date :** Wednesday, May 18, 2022

**Time:** 18:00

**Place:** Zoom