

# Towards Rigorous Neural Control

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## **Abstract**

Learning-based and data-driven approaches are becoming an indispensable part of automation and autonomous systems. Control and planning components based on neural networks challenge existing methods for ensuring reliability and safety of these systems. By taking a numerical and statistical perspective on synthesis and verification, it is possible to still prove strong properties for highly nonlinear systems with highly nonlinear control laws. Interestingly, we often need to make use of inductive certificates that are themselves neural networks to obtain rigorous proofs in this context.