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Towards Intelligent Control Loop Fault Diagnosis in Process Industries A Thesis Submitted in Partial Fulfillment of the Requirement for the Degree of DOCTOR OF PHILOSOPHY in Chemical Engineering By Abhishek Bansal 196107101 Department of Chemical Engineering Indian Institute of Technology Guwahati Guwahati-781039, Assam, India February, 2026 Department of Chemical Engineering Indian Institute of Technology Guwahati India Certificate It is certified that the work described in this thesis, entitled "Towards Intelligent Control Loop Fault Diagnosis in Process Industries", by Mr. Abhishek Bansal, for the award of the degree of Doctor of Philosophy, is an authentic record of the results obtained from the research work carried out under our super- vision at the Department of Chemical Engineering, Indian Institute of Technology Guwahati, Guwahati, India, and this work has not been submitted elsewhere for a degree. Signature Prof. Prabirkumar Saha Date: Signature Dr. Resmi Suresh Date: 26 May 2026 Department of Chemical Engineering Indian Institute of Technology Guwahati Guwahati – 781039, Assam, India Indian Institute of Technology Guwahati Department of Chemical Engineering Statement I hereby declare that the work presented in this