

# **Introduction to sliding mode controller and its application to wind turbine control**

Dr. Debashisha Jena

Rom No. 205, Department of Electrical and Electronics Engineering,  
National Institute of Technology Karnataka Surathkal (NITK),  
Srinivasnagar Post, Mangalore-575025  
Karnataka, India  
Email: [djena.2490EE@nitk.edu.in](mailto:djena.2490EE@nitk.edu.in)

The theory of variable structure systems (VSS) with sliding modes is currently one of the most significant research topics within the control engineering domain. Variable structure systems consist of a set of continuous subsystems together with suitable switching logic. The idea of sliding mode control (SMC) is to employ different feedback controllers acting on the opposite sides of a predetermined surface in the system state space. Each of those controllers pushes the system representative point (RP) towards the surface, so that the RP approaches the surface, and once it hits the surface for the first time it stays on it ever after. In this work a SMC based nonlinear controller is designed for region 2 and region 2.5 operation of a wind turbine whereas conventional PI control is adapted for region 3 of a three bladed FAST VSWT.