

# Advanced diagnostics for preventive maintenance and early fault detection in high performance servo motors and drives

19. march 2020, boban@etf.rs

## Table Of Contents

- 1 Introduction..... 2
- 2 List of relevant but inaccessible variables ..... 2
- 3 Quick faults - related to accidents and not to aging..... 3
- 4 Slow faults - related to slow degradation and aging ..... 3
- 5 Measurements readily available within standard drives ..... 4
- 6 Additional sensors that could be mounted without major difficulties ..... 5
- 7 Case study 1: Sensorless detection of the winding temperature ..... 5
- 8 Case study 2: Detection of defects in winding insulation..... 5
- 9 Case study 3: Defects in magnetic circuit of the motor ..... 6
- 10 Case study 4: Detecting damage to permanent magnets ..... 7
- 11 Case study 5: Detection of bearing defects..... 8
- 12 Case study 6: Detection of the rotor excentricity..... 8
- 13 Case study 7: Excessive radial forces applied to the shaft ..... 8
- 14 Shaft voltages ..... 9