

**POLITECHNIKA ŚLĄSKA**  
Wydział Elektryczny  
Instytut Metrologii, Elektroniki i Automatyki

mgr inż. Arkadiusz Gancarczyk

Rozprawa doktorska

**Profilometryczny wizyjny system diagnostyczny  
tramwajowych zestawów kołowych**

Promotor:  
prof. dr hab. inż. Tadeusz Skubis

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# The diagnostic vision system to measurement profiles of tram wheelsets

## Abstract

The paper presents a mathematical model of the vision system to measurement of geometrical parameters of the tram wheel while in motion. This system working in an environment of changing conditions. Also, developed measurement solution that is characterized small measurement uncertainty of geometric parameters of tram wheels, acceptable when deciding on the regeneration of the wheelset.

PhD thesis has a practical nature. Described mathematical models were used for vision system to measure wheels of tram. The results are based on an analysis of the wheel profiles on the basis of measurements carried sets under actual working conditions. The paper presents experimental studies, a theory and analysis results, which are a confirmation of the correctness of the methods of measurement and analysis.

PhD thesis describes the two alternative methods for calibrating vision system to measuring geometrical parameters of the wheels. The first one uses a dot pattern that is set on a rail parallel to the planes of laser lines. The algorithms allow for quick and precise adjustment of parameters adopted mathematical model. In the second part this paper, is developed an alternative mathematical model of measurement, which allows on the calibration of the measurement system using a single tram axis as a model.

The experimental results were analyzed in detail, with particular attention to measurement errors.