



**INSTYTUT PODSTAW BUDOWY MASZYN POLITECHNIKI  
WARSZAWSKIEJ**

**INSTITUT DES PRINCIPES DE CONSTRUCTION DES MACHINES  
INSTITUTE OF MACHINE DESIGN FUNDAMENTALS  
WARSAW UNIVERSITY OF TECHNOLOGY**

oraz/et/and

**KOMITET BUDOWY MASZYN  
POLSKIEJ AKADEMII NAUK**

**COMITEE DE CONSTRUCTION DES MACHINES et  
DE L'ACADEMIE DES SCIENCES POLONAISE**

**COMITTY OF MACHINERY  
POLISH ACADEMY OF SCIENCES**

we współpracy z /en collaboration /in collaboration with

**UNIVERSITÉ DE PERPIGNAN,**

**INSTITUT NATIONAL DES SCIENCES APPLIQUES  
CENTRE VAL DE LOIRE**

**ET**

**UNIVERSITÉ DE SCIENCES ET TECHNOLOGIE DE LILLE**

mają przyjemność zaprosić na /ont le plaisir de vous invite à /have a pleasure to invite for

**XXIV FRANCUSKO-POLSKIE SEMINARIUM  
MECHANIKI**

**XXIV SÉMINAIRE FRANCO-POLONAIS EN MÉCANIQUE**

**XXIV FRENCH-POLISH SEMINAR OF MECHANICS**

data i miejsce seminarium /date et place de seminaire/ date and place of the seminar

**17 PAŹDZIERNIKA / OCTOBRE / OCTOBRE 2014**

Gmach Samochodów i Ciągników PW, Warszawa ul. Narbutta 84/  
Bat. des Vehicules et Tractors PW, Varsovie, 84 rue Narbutta,  
Building of Vehicles and Tractors PW/ Warsaw, Narbutta 84 St.

**Robert Konowrocki**

Institute of Fundamental Technological Research, Polish Academy of Sciences

**Evaluation of electromechanical coupling parameters of the railway vehicle electric drive system to condition monitoring of the drive.**

**Abstract**

In the framework of studies there are presented results of numerical investigation of the electromechanical drive system of the railway vehicle. Here, electric parameters of the asynchronous motor are rated to condition monitoring of the drive. Evaluation of the parameters can be used to create guidelines to a monitoring system. Main informations about a torsional vibration of wheelsets generated by friction coefficient in wheel-rail zone are provided by electric parameters obtained from a dynamic electromechanical drive model. The vibrations of wheelsets generated by a self-excited vibration mechanism of wheel-rail contact systems is very harmful. Proposed approach is alternative solution for monitoring of the torsion vibration in considered driving system. Results of this analysis can be used in order to investigate the drive system's sensitivity to torsional oscillations.

**Introduction**

The cost of maintenance, the reliability and the safety of railway operation depend strongly on the quality of the wheelsets and driving systems. Deformations and mechanical vibrations are phenomena associated with a functioning of majority of railway vehicle drivetrain structures. The time dependent variation of the contact forces between the wheels and the rails is highest importance, as sources of a torsion vibration in the systems. The knowledge about torsional vibrations in drive transmission systems of railway vehicles is of a great importance in the fields dynamics and fatigue of the mechanical systems.