Stratis Kanarachos

Senior Lecturer at University of Coventry, UK

My Research Vision

My main inspiration is to study, design and develop systems with superior performance. Efficiently controlling in real-time the motion of a system while respecting various constraints (actuator saturation, state limitations, non-linear dynamics) and performance requirements (energy consumption, comfort, fatigue) is a highly nonlinear problem for which no closed form solutions exist.

What I hope to achieve in the next five years is to significantly contribute to the development of a highly energy efficient autonomous suspension system with particular focus on passenger comfort and to the development of an autonomous vehicle with provably improved predictive capability.

BIOGRAPHY

I graduated in 2001 from the Mechanical Engineering Course at National Technical University of Athens (NTUA), Greece where I earned also my Ph.D. degree in 2004 by successfully defending my thesis ‘Analysis of Mechanisms using the Finite Element Method’.

I was holding the position of Lecturer and Assistant Professor at Frederick University (Cyprus) for the periods 2005-2007 and 2007-2012 respectively. It was in my duties to teach the courses “Vehicle Dynamics & Control”, “Mechanical Vibrations & Machine Dynamics”, “Dynamics”, “Engineering Design & Numerical Optimization” and “Quantitative Methods in Engineering Management” in the Programmes of study “BSc in Mechanical Engineering”, “BSc in Automotive Engineering” and “MSc in Engineering Management”.

In the period 2012-2014 I was working at the Integrated Vehicle Safety Department of TNO, the Netherlands as a senior researcher. Integrated vehicle controller concepts and model reduction techniques were the main research topics.

Selected Outputs

- Alirezaei M., **Kanarachos, S**., "*An adaptive finite element method for computing emergency maneuvers of ground vehicles with arbitrary boundary conditions*", submitted to International Journal of Vehicle Systems Modelling and Testing, January 2014
- Alirezaei M., **Kanarachos, S**., "*Adaptive Regenerative Braking for Electric Vehicles with an Electric Motor at the Front Axle using the State Dependent Riccati Equation Control Technique*", submitted to WSEAS Transactions on Systems & Control, 2013
- "*A new min-max methodology for computing optimized obstacle avoidance steering manoeuvres of ground vehicles*", International Journal of Systems Science Vol. 45 (5), 2014, pp.1042-1057
- "Intelligent semi-active vehicle suspension systems using neural networks", International Journal of Vehicle Systems Modeling & Testing, Vol. 7 (2), 2012, pp. 135-158
- **Kanarachos, S.A**. , Koulocheris, D.V., Spentzas, K.N., "Synthesis of nonlinear dynamic systems using parameter optimization methods - A case study", WSEAS Transactions on Computers Vol. 4 (1), 2005, pp. 58-63
- Spentzas, K., **Kanarachos**, **S.** "*Design of a non-linear hybrid car suspension system using neural networks"*, Mathematics and Computers in Simulation Vol. 60, 2002, pp. 369-378
- Spentzas, K.N. and **Kanarachos**, **S.A.** *"A neural network approach to the design of a vehicle's non-linear hybrid suspension system"*, Proc Instn Mech Engrs, 2002, Vol. 216 Part B: J Engineering Manufacture, IMechE
- **Kanarachos**, **S.**, "*Analysis of 2D flexible planar mechanisms using linear finite elements and incremental techniques*", Computational Mechanics Vol 42, 2008, pp. 107-117
- **Kanarachos S.A.,** Kanarachos A. "*Minimum order bang-bang guidance for feedforward obstacle avoidance steering maneuvers*", International Journal of Automotive Technology Vol. 14 (1), 2013, pp. 37-46
- **Kanarachos S.A.,** "*Design of an intelligent feed forward controller system for vehicle obstacle avoidance using neural networks*", International Journal of Vehicle Systems Modelling and Testing, 2013, Vol.8, No.1, pp.55 – 87

Selected Projects

- **Pro-Active Incident Management,** CEDR Transnational Road Research Programme: Call 2013, 2014-2015

- **AMBER- Ultra Light Electric Vehicle,** FP7, 2013-2016

- **Study on some safety-related aspects of tyre use,** EC tender, 2013-2014

- **Model Reduction for Large Scale Systems,** Enabling Technology Programme -TNO, 2013-2014

- **Intelligent Dynamics for Electric Vehicles (ID4EV), FP7, ICT-2010.10, 2010-2013**

- **Engine Lubricating System Technologies, FP7 AAT-2008-RTD-1, 2009-2013**

- **Design and manufacturing of large thin-walled composite light-weight structures, EUREKA, 2005-2008**

- **New guardrail system design for the improvement of vehicle crash safety, Research Promotion Foundation Cyprus RPF, 2005-2007**

- **New guardrail system design for critical collision cases in Cyprus highways, Research Promotion Foundation Cyprus, 2005-2007**

- **Lighter Heavy Vehicles, General Secreteriat for Research & Technology, 2002-2004**