

# Benchmark SCARA Robot - Modelling Comparisons for Movement and Collision Avoidance

Claudia Wyrzens<sup>1</sup>, Tamara Vobruba<sup>1</sup>, Andrea Kainz<sup>1</sup>, Irene Hafner<sup>2</sup>,  
Felix Breitenecker<sup>1</sup>

<sup>1</sup>TU Wien, ARGESIM/Mathematical Modelling and Simulation,  
Wiedner Hauptstrasse 8-10, 1040 Vienna, Austria

<sup>2</sup>dwh Simulation Services, Neustiftgasse 57-59, 1070 Vienna, Austria  
{claudia.wyrzens, tamara.vobruba, felix.breitenecker}@tuwien.ac.at  
Andrea.Kainz@student.tuwien.ac.at  
Irene.Hafner@dwh.at

**Abstract.** Simulation Notes Europe (SNE), EUROSIM's membership journal, features a series on benchmarks for modelling approaches and simulation implementations. Up to now, 23 benchmarks have been defined, and 347 'solutions' with different modelling approaches and simulation implementations have been published in SNE. This contribution discusses the ARGESIM Benchmark C11'SARA Robot', with up to now 12 'solutions' sent in. The benchmark aims for modelling and simulation of a point-to-point motion of a three axis SCARA (Selective Compliance Assembly Robot Arm) robot including collision avoidance modelling and collision avoidance control. The contributions compares different modelling approaches used, e.g. considering either an explicit or implicit model description. Of interest are different implementations of collision avoidance, on modelling side, and on control side. Simulation implementations in various simulation tools, as for example in Simulink and in Matlab show a broad variety of approaches – so that advantages as well as disadvantages of the simulation tools can be pointed out.

**Keywords:** SCARA Robot, obstacle avoidance, Simulink, Matlab, modelling and simulation, model comparison