

Ibex – Mechatronics Simulation Framework

Optimization of development process with the use of virtual prototyping is one goal of the institute of electronics. With Ibex this goal has been realized in a powerful simulation framework.



Motivation

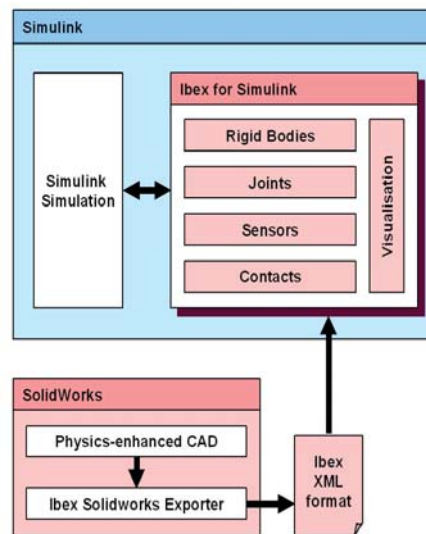
During the last three years, several successful projects and theses have been completed at the Institute of Electronics (IfE) on real-time physics and mechatronics simulation software. These software projects have been further developed and compiled into a generic framework – Ibex.

Description

Ibex is an environment for simulation and visualisation of rigid body dynamics. It can be run either as standalone application or operated as a co-simulation module within existing software. A further important feature is the high level of integration with existing development environments.

The rigid body models are most conveniently designed in a CAD program and are easily imported into Ibex. For SolidWorks® a plug-in has been developed with which a complete Ibex simulation can be configured within the native user interface mechanical engineers are familiar with.

The scope of simulation domains can be significantly increased through the seamless integration with existing third party modelling and control software, namely MathWorks Simulink. In such a configuration the Ibex toolbox gives access to all information about the simulated rigid bodies, joints, sensors as well as contact events. The behaviour of the simulation can be influenced by applying forces and torques to the rigid bodies through the same interface. Such a co-simulation allows powerful possibilities of virtual prototype development and comprehensive preliminary testing. For designing automatic control algorithms the Ibex toolbox provides an accurate model of the dynamic plant behaviour, thus greatly supporting the development process. An additional benefit is given by the enclosed visualisation module, which in conjunction with the above mentioned setup, creates a fully functional model of the final product at an early development stage.



Results

With the Ibex framework, the success of product development for industrial application can be increased. A significant amount of resources can be saved by using Ibex virtual prototypes. Further, Ibex easily fits into existing development processes thanks to its easy integration with well established software platforms. At IfE, Ibex has been successfully applied to education, research as well as various industry projects.

Project
Ibex

Project Duration
24 months

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