

Proceedings

Robotic Systems for Handling and Assembly

3rd International Colloquium of the
Collaborative Research Center SFB 562

Braunschweig | Germany
April 28-29, 2008



Edited by
D. Schütz, A. Raatz, F. M. Wahl

Fortschritte in der Robotik Band 14

Shaker Verlag

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <http://dnb.d-nb.de>.

Copyright Shaker Verlag 2008

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

Printed in Germany.

ISBN 978-3-8322-7129-9

ISSN 1431-7222

Shaker Verlag GmbH • P.O. BOX 101818 • D-52018 Aachen

Phone: 0049/2407/9596-0 • Telefax: 0049/2407/9596-9

Internet: www.shaker.de • e-mail: info@shaker.de

Contents

Preface

F. M. Wahl, D. Schütz	5
-----------------------------	---

THEORETICAL FOUNDATIONS

The Conceptual Design of Robotic Architectures by Means of a Complexity Measure

J. Angeles, W. A. Khan, S. Caro, D. Pasini	7
--	---

Dealing with Singularities in Planar Parallel Manipulators

P. Wenger	23
-----------------	----

Dynamics Identification of Parallel Manipulators

H. Abdellatif, J. Kotlarski, B. Heimann.....	37
--	----

WIRE-BASED SYSTEMS & CONTROL I

Cable-Based Parallel Manipulators for Rehabilitation Purposes of Human Limbs

M. Ceccarelli, E. Ottaviano	53
-----------------------------------	----

Force and Visual Control for Human-Robot Cooperation

A. De Santis, V. Lippiello, B. Siciliano, L. Villani	69
--	----

PROGRAMMING & CONTROL

Advances in Automated Robot Programming

S. Molkenstruck, U. Thomas, F. M. Wahl.....	85
---	----

Advances in Motion Control for**High-Performance Parallel Robots**

J. Maaß, M. Kolbus, C. Bier, F. Wobbe, W. Schumacher, A. Raatz, J. Hesselbach	101
--	-----

Engineering Self-Management into a Robot Control System

J. Steiner, A. Amado, U. Goltz , M. Hagner, M. Huhn.....	113
--	-----

A Communication Architecture for Support of**Distributed Computing in Real-Time Environments**

H. Michalik, Y. Dadji, J. Maaß.....	127
-------------------------------------	-----

INDUSTRIAL DEVELOPMENTS**The Gantry-Tau – Summary of Latest Development****at ABB, University of Agder and University of Queensland**

G. Hovland, M. Choux, M. Murray, I. Tyapin, T. Brogårdh	141
---	-----

Modular Parallel Kinematic Machines**for Automotive Fixturing**

S. Kock, S. Soetebier, F. Legeleux, W. Waldi, K. Hug	159
--	-----

COMPONENTS & ADAPTRONICS**Integration of Sensors and Actuators in****Joints of Parallel Robots**

H.-J. Franke, N. Pavlovic, M. R. Kirchhoff, S. Büttgenbach.....	169
---	-----

Adaptive Components for Parallel Robots

R. Keimer, M. Sinapius	181
------------------------------	-----

**Robust Gain-Scheduling Control for Parallel Robots
with Smart-Structure Components**

S. Algermissen, M. Rose, M. Sinapius, K. Stachera..... 191

NEW PARALLEL ARCHITECTURES

From Par4 to Adept Quattro

F. Pierrot, V. Nabat, O. Company, S. Krut..... 207

**Optimized Change of Working and Assembly Mode
of the SFB 562 TRIGLIDE-Robot**

C. Budde, M. Kolbus, P. Last, A. Raatz, J. Hesselbach, W. Schumacher 221

**New Variants of Delta Robots and
Double-Tilt Platform for Assembly**

R. Clavel, P. Pham, B. Lorent, B. Le Gall, M. Bouri 237

Authors 251