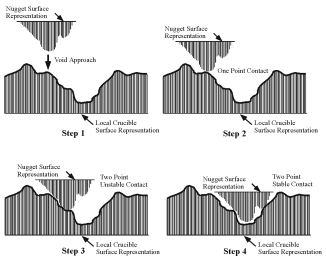
Robotics in Manufacturing
Chairs: Steve Dubowsky, T. C. Steve Hsia

Application of a Model-free Algorithm for the Packing of Irregular Shaped Objects in Semiconductor Manufacture

V. A. Sujan and S. Dubowsky
Massachusetts Institute of Technology

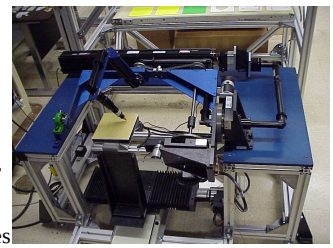
- Online packing of highly irregular shaped objects
- An online Virtual Trial and Error algorithm developed
- Cost function optimization results in packing densities of 60
- The model-free algorithm applied to crucible packing in CZ wafer production with success



Design and Evaluation of a Laser-Cutting Robot for Laminated, Solid Freeform Fabrication

S. Choi and W. S. Newman
Case Western Reserve University

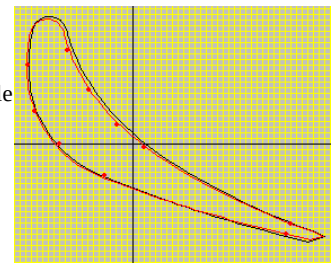
- Motivation: fast/accurate laser cutting for solid freeform fabrication
- Approach: 4-dof design with articulated optics
- Results: higher speed, accuracy, ease of control
- Conclusions: new design enables faster SFF method



Optimal Profile Generation in Distorted Surface Finishing

Z. Gong, X. Q. Chen and H. Huang
Gintic Institute of Manufacturing Technology

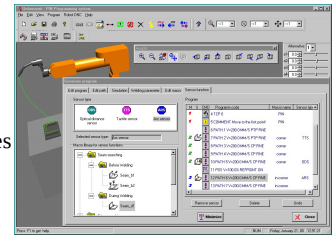
- The problem: Find distorted airfoil surface
- Template-based optimal profile fitting
- Direct search minimization algorithm
- Application (video show)



User Oriented Integration of Sensor Operations in a Offline programming System for Welding Robots

Wenrui Dai and Markus Kampker
European Center for Mechatronics, Germany

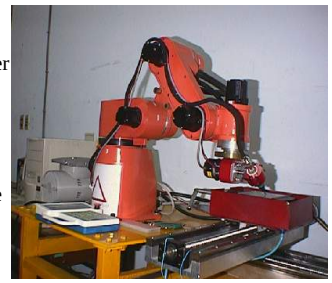
- Offline programming sensor operations for welding robots
- Icon-oriented user interface
- Macro programming techniques
- Low-cost (PC-based) and high performance



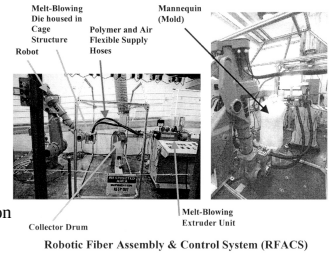
A Robot-Assisted Finishing System with an Active Torque Controller

Y. T. Wang and J. Y. Jan
Tamkang University

- Single-axis active torque controller
- Linear grinding-force model
- Software grinding force observer
- Grinding and polishing workpiece with 3D curved-surfaces



On the Use of Robotics for Melt-Blowing to Form Shaped/Molded Fabric Structures

Raoul Farer, Edward Grant, Tushar Ghosh, Abdelfattah Seyam and Gordon Lee
North Carolina State University

- Modified a robotic systems to work with a fiber assembly and control system for melt-blowing
- Developed models for the mannequin's geometry and its interaction with robot melt-blowing system
- Developed control algorithms for tool position/orientation and mannequin mold position/orientation
- Implemented control algorithms on an actual Robot System