

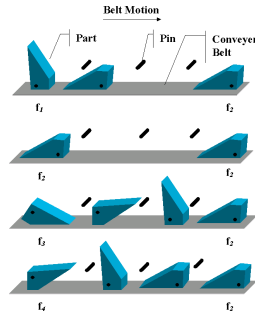
Part Feeding and Fixturing

Organizers & Chairs: Ken Goldberg, Jeff Trinkle

The Toppling Graph: Designing Pin Sequences for Part Feeding

T. Zhang¹, G. Smith¹, R. Berretty², M. Overmars² and K. Goldberg¹
¹University of California, Berkeley and ²Utrecht University

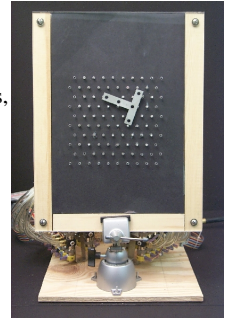
- This paper extends Lynch's approach to feeding parts on a conveyor belt using pins.
- We introduced the toppling graph, which identifies critical pin heights that permit toppling, and give an $O(n^2)$ algorithm to compute it.
- We develop an $O(n^{3n})$ algorithm for designing pin sequences.



A Reconfigurable Parts Feeder with an Array of Pins

S. Blind, C. McCullough, S. Akella and J. Ponce
 University of Illinois

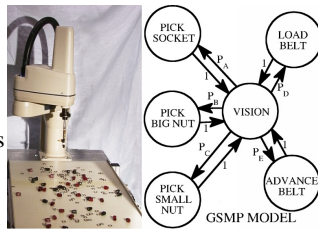
- We present a
- We compute part equilibrium configurations, their capture regions, and a transition graph for planning.
- A planner and a prototype device with 68 pins have been implemented.
- The



Modeling and Throughput Prediction for Flexible Parts Feeders

M. S. Branicky, G. C. Causey and R. D. Quinn
 Case Western Reserve University

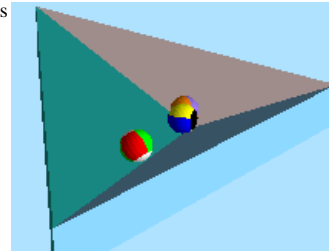
- Flex Feeders: key technology; not well understood
- GSMP simulation & analysis for modeling/prediction
- Physical tests to derive models & validate results
- Throughput prediction for novel feeding scenarios



An Implicit Time-Stepping Scheme for Rigid Body Dynamics with Inelastic Collisions and Coulomb Friction

D. Stewart¹ and J. C. Trinkle²
¹University of Iowa and ²Sandia National Labs

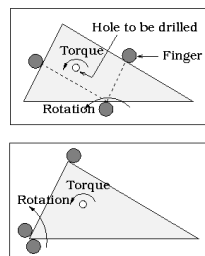
- Previous complementarity methods can lack solutions
- New impulsive method always has solutions
- Method is convergent as step-size reduces
- Method needs no explicit collision checking



On Well-Defined Kinematic Metric Functions

Q. Lin and J. W. Burdick
 California Institute of Technology

- Metric functions: scalar functions of rigid configs., velocities & wrenches.
- Utility: to assess robotic metric attributes (e.g. distance, length & angle).
- Approach: intrinsic characterization of objectivity of metric functions.
- Results: objectivity as related to frame-invariance and left, right & bi-invariances.



Which fixture has smaller disp.?

Positioning and Orienting a Class of Symmetric Parts Using a Combination of a Unit-Radial and a Constant Force Fields

F. Lamiroux and L. Kavraki
 Rice University

- Uniquely orient parts using force fields in a plane
- Combination of radial and constant force fields
- None
- Some parts uniquely posed up to symmetry

