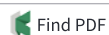


## Web of Science



Search Search Results

Tools ▼ Searches and alerts ▼ Search History Marked List



Add to Marked List

◀ 9 of 60 ▶

## Kinematics Analysis and Trajectory Validation of Two Cooperative Manipulators Handling a Flexible Beam

By: Samewoi, AR (Samewoi, Abdul Rahman)<sup>[1]</sup>; Azlan, NZ (Azlan, Norsinnira Zainul)<sup>[1]</sup>; Khan, R (Khan, Raisuddin)<sup>[1]</sup>

2019 7TH INTERNATIONAL CONFERENCE ON MECHATRONICS ENGINEERING (ICOM)

Book Group Author(s): IEEE

Pages: 128-133

Published: 2019

Document Type: Proceedings Paper

### Conference

Conference: 7th IEEE International Conference on Mechatronics Engineering (ICOM)

Location: Putrajaya, MALAYSIA

Date: OCT 30-31, 2019

Sponsor(s): Int Islam Univ Malaysia; Univ Tun Hussein Malaysia; IEEE Robot &amp; Automat Soc; Inspilogix; ProStrain Technologies; IEEE

### Abstract

Kinematics and a trajectory are necessary for dynamics modelling and control design of two cooperative manipulators in handling a flexible beam. Lack of information regarding the kinematics and the trajectory of a system can lead to inaccuracy and infeasibility results of the simulation and the experiment. This paper presents kinematics analysis and trajectory validation of two cooperative manipulators handling a flexible beam. The kinematics of the system and the desired trajectory is validated by using Simulink and geometrically visualised by using GeoGebra. Simulation results showed that joint angles and the manipulators' configuration were influenced by some parameters such as the positions and the orientation of beam's midpoint, the base distance between two manipulators, the manipulators' elbow-typed configuration as well as the radius and the centre point of the circular desired trajectory.

### Keywords

Author Keywords: cooperative manipulators; flexible beam; forward and inverse kinematics; trajectory validation

### Author Information

Reprint Address: Samewoi, AR (corresponding author)

+ Int Islamic Univ Malaysia, Kulliyyah Engn, Dept Mechatron Engn, Kuala Lumpur, Malaysia.

Addresses:

+ [ 1 ] Int Islamic Univ Malaysia, Kulliyyah Engn, Dept Mechatron Engn, Kuala Lumpur, Malaysia

E-mail Addresses: abdrahman2807@gmail.com; sinnira@iium.edu.my; raisuddin@iium.edu.my

### Funding

Funding Agency	Grant Number
World Academy of Sciences (TWAS)	JP20160624104750

[View funding text](#)

### Publisher

IEEE, 345 E 47TH ST, NEW YORK, NY 10017 USA

### Categories / Classification

Research Areas: Automation &amp; Control Systems; Engineering

Web of Science Categories: Automation &amp; Control Systems; Engineering, Electrical &amp; Electronic; Engineering, Mechanical

[See more data fields](#)

### Citation Network

In Web of Science Core Collection

0

Times Cited

[Create Citation Alert](#)

17

Cited References

[View Related Records](#)

### Use in Web of Science

Web of Science Usage Count

0

Last 180 Days

0

Since 2013

[Learn more](#)

This record is from:

Web of Science Core Collection

- Conference Proceedings Citation Index-Science

[Suggest a correction](#)

If you would like to improve the quality of the data in this record, please [suggest a correction](#).

## Cited References: 17

Showing 17 of 17 [View All in Cited References page](#)

(from Web of Science Core Collection)

1. Title: [not available] Times Cited: 1  
By: Ashayeri, A.; Eghtesad, M.; Khebreh, A.  
Adaptive Neuro-Fuzzy Control Design for Two Cooperating Robot Manipulators Handling a Flexible Beam Volume: 40 Issue: 21 Published: 2007  
Publisher: IFAC
2. [Robust control of two 5 DOF cooperating robot manipulators](#) Times Cited: 3  
By: Azadi, Mohammad; Eghtesad, Mohammad; Ghobakhloo, Amir  
9TH IEEE INTERNATIONAL WORKSHOP ON ADVANCED MOTION CONTROL, VOLS 1 AND 2, PROCEEDINGS Pages: 653 -+ Published: 2006
3. [Collaborative manipulators handling flexible object in joint space: Modelling, control and analysis](#) Times Cited: 1  
By: Balasubramanian, E.; Abilash, S.; Ahammed, S. R.  
Int. J. Mech. Prod. Eng. Res. Dev. Volume: 3 Issue: 1 Pages: 163-180 Published: 2013
4. [Six-DOF Impedance Control of Dual-Arm Cooperative Manipulators](#) Times Cited: 114  
By: Caccavale, Fabrizio; Chiacchio, Pasquale; Marino, Alessandro; et al.  
IEEE-ASME TRANSACTIONS ON MECHATRONICS Volume: 13 Issue: 5 Pages: 576-586 Published: OCT 2008
5. [Regressor based robust control for collaborative manipulators handling a rigid object](#) Times Cited: 1  
By: Esakki, B.; Bhat, R. B.; Su, C. Y.  
IFAC Proceedings Volumes Volume: 44 Issue: 1 Pages: 14681-14686 Published: 2011
6. [Dynamics and Control of Collaborative Robot Manipulators](#) Times Cited: 1  
By: Esakki, Balasubramanian; Ahmed, S. Riyaz  
2015 INTERNATIONAL CONFERENCE ON SMART TECHNOLOGIES AND MANAGEMENT FOR COMPUTING, COMMUNICATION, CONTROLS, ENERGY AND MATERIALS (ICSTM) Pages: 590-595 Published: 2015
7. [Robust Control of Collaborative Manipulators - Flexible Object System](#) Times Cited: 5  
By: Esakki, Balasubramanian; Bhat, Rama B.; Su, Chun-Yi  
INTERNATIONAL JOURNAL OF ADVANCED ROBOTIC SYSTEMS Volume: 10 Article Number: 257 Published: MAY 27 2013
8. [Variable Structure Control for Space Robots Based on Neural Networks Regular Paper](#) Times Cited: 8  
By: Fang, Yaming; Zhang, Wenhui; Ye, Xiaoping  
INTERNATIONAL JOURNAL OF ADVANCED ROBOTIC SYSTEMS Volume: 11 Article Number: 11 Published: MAR 7 2014
9. Title: [not available] Times Cited: 2  
By: Lewis, F. L.; Dawson, D. M.; Abdallah, C. T.  
Manipulator Control Theory and Practice Published: 2004
10. [Stabilizing a flexible beam handled by two manipulators via PD feedback](#) Times Cited: 29  
By: Liu, YH; Sun, D  
IEEE TRANSACTIONS ON AUTOMATIC CONTROL Volume: 45 Issue: 11 Pages: 2159-2164 Published: NOV 2000
11. [Cooperative Object Manipulation with Contact Impact Using Multiple Impedance Control](#) Times Cited: 20  
By: Moosavian, S. Ali A.; Papadopoulos, Evangelos  
INTERNATIONAL JOURNAL OF CONTROL AUTOMATION AND SYSTEMS Volume: 8 Issue: 2 Pages: 314-327 Published: APR 2010
12. [Modeling and impedance control of a two-manipulator system handling a flexible beam](#) Times Cited: 15  
By: Sun, D; Liu, YH  
JOURNAL OF DYNAMIC SYSTEMS MEASUREMENT AND CONTROL-TRANSACTIONS OF THE ASME Volume: 119 Issue: 4 Pages: 736-742  
Published: DEC 1997
13. [Two-Time Scale Fuzzy Logic Controller and Observer Design for Trajectory Tracking of Two Cooperating Robot Manipulators Handling a Flexible Beam](#) Times Cited: 1  
By: Tavasoli, A.; Eghtesad, M.; Farid, M.; et al.  
EUROCON 2007 INT C C Volume: 57 Pages: 212-221 Published: 2007  
no. 2  
[\[Show additional data\]](#)