



The 3rd Joint International Conference on IMSD The 7th ACMD 2014
Multibody System Dynamics Asian Conference on Multibody Dynamics
June 30(Mon.) - July 3(Thu.), 2014 / Busan(BEXCO), Korea

Experience Sharing on visit to Busan, South Korea

PARAMANAND NANDIHAL

Preparation

- ▶ Applying for funds
- ▶ Visa Application
- ▶ Air ticket
- ▶ Travel insurance
- ▶ Conference registration
- ▶ Accommodation arrangement

Funding Agencies

- ▶ **IIT**
- ▶ Department of Science & Technology (**DST**)
- ▶ Council of Scientific and Industrial Research (**CSIR**)
- ▶ **AICTE** (Applicant must be employed in University/Institution/College recognized by the AICTE)
- ▶ Indian National Science Academy (**INSA**)
- ▶ Centre for International Co-operation in Science (**CICS**)

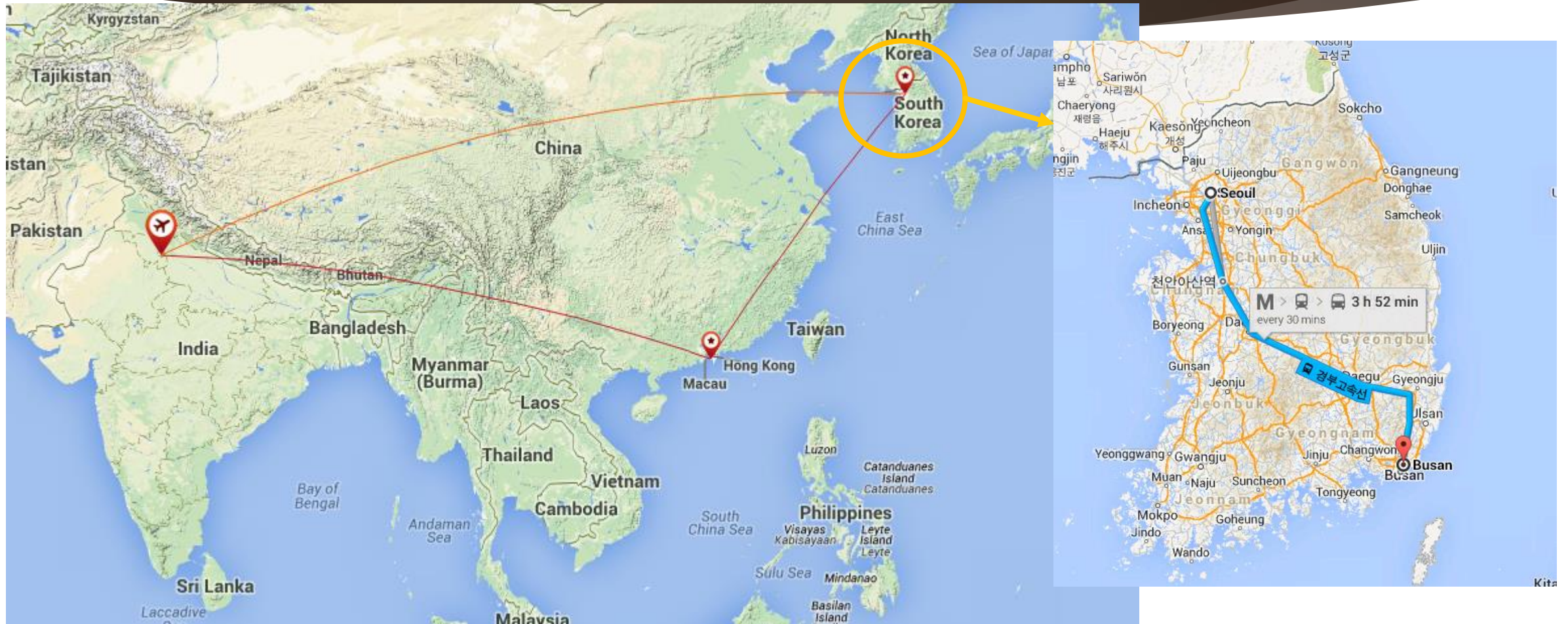
DST International Travel Grant

- ▶ Application form: www.dst.gov.in
- ▶ Documents required
 - ▶ Invitation letter
 - ▶ Bio-data
 - ▶ List of publications
 - ▶ Conference advertisement
 - ▶ Conference paper abstract
 - ▶ Air India quotation
- ▶ Reimbursement: After coming back

Tour summary



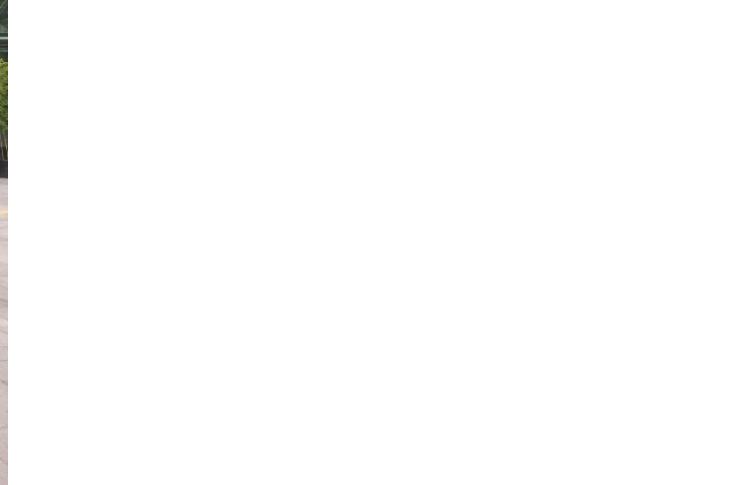
Route Map



Sunrise



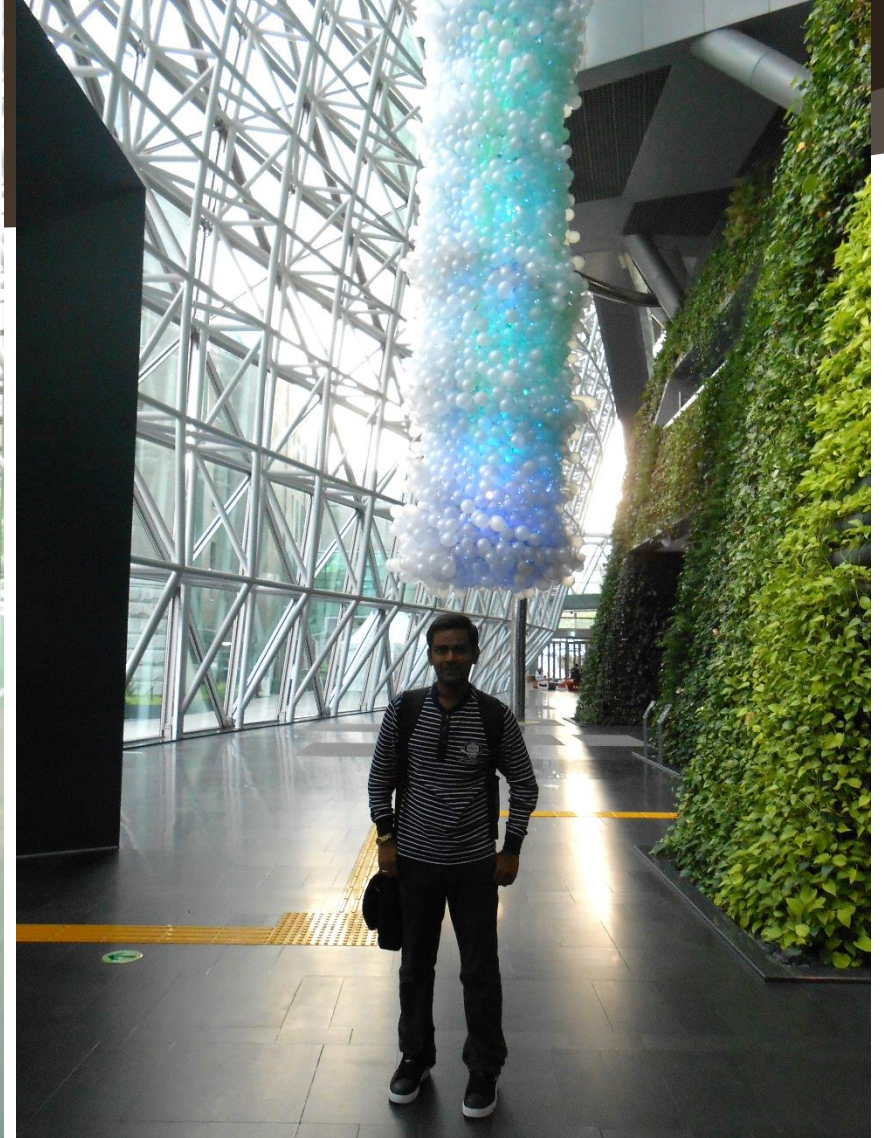
At Seoul



At Seoul



At Seoul



KTX high speed train



Busan



Busan



Conference venue: BEXCO



INDIA representation in conference



Multibody dynamic song....



Dynamics of Closed-Loop Rigid-Flexible Multibody Systems Using DeNOC Matrices

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My



The 3rd

Typical n -link robotic system

5

The diagram illustrates an n -link robotic system. On the left, a vertical stack of links is shown, labeled #0 (Base), #1, #2, ..., # i , # $i+1$, ..., # n . The end effector is labeled # n . A yellow box highlights the joint between links # i and # $i+1$. On the right, a detailed view of a joint shows a 'Hub' at the origin O_i of a coordinate frame (X_i, Y_i, Z_i) . The link i is represented by a vector a_i along the X_{i-1} axis. The joint is shown in two states: 'undeformed' and 'deformed'. The 'undeformed' state shows the link i and link $i+1$ meeting at origin O_{i-1} of frame $(X_{i-1}, Y_{i-1}, Z_{i-1})$. The 'deformed' state shows the link i rotated by an angle θ_{i-1} around the Z_{i-1} axis, and the link $i+1$ rotated by an angle θ_i around the X_{i-1} axis. The distance between the origins O_i and O_{i-1} is labeled b_i . The end effector is shown as a yellow arrow pointing from the origin O_n of the final frame (X_n, Y_n, Z_n) .

ACMD2014

The 3rd

18

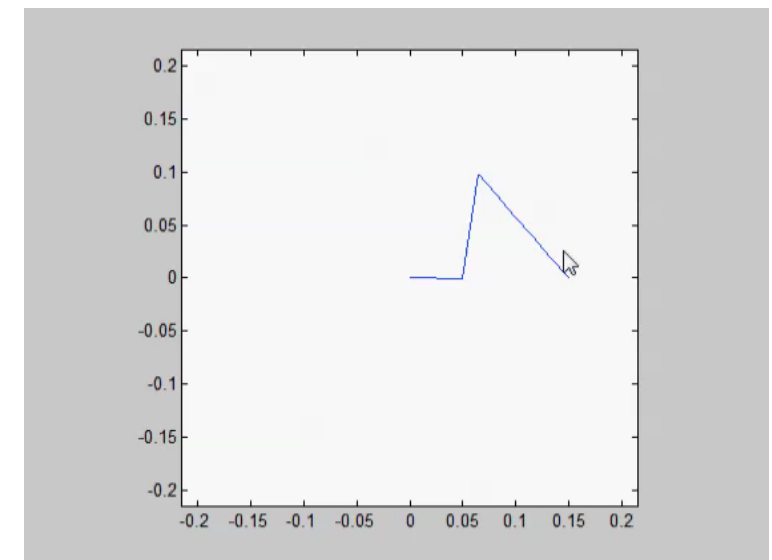
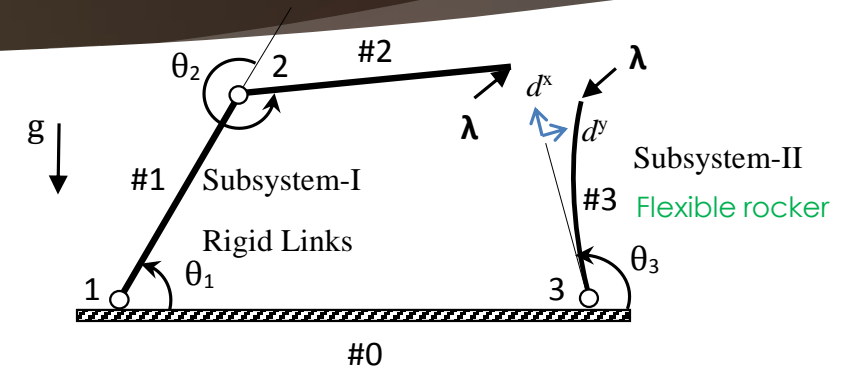
in Dynamics
CS

ACMD2014
BECS Sezon Korea

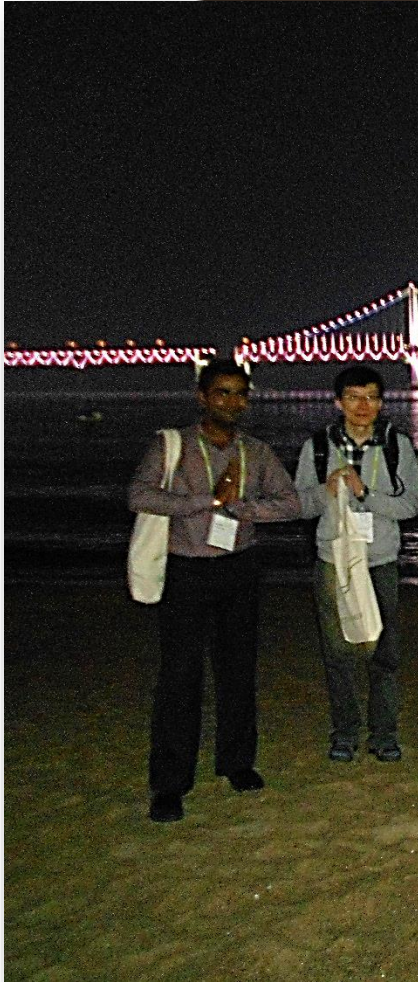
The right side of the slide features decorative elements including a large number '18' at the top, a wavy line graphic, and a vertical yellow bar. The background has a pattern of wavy lines and the text 'The 3rd' and 'in Dynamics CS'. At the bottom, there is a logo for 'ACMD2014 BECS Sezon Korea'.

Presentation overview

- ▶ The use of the **DeNOC-based formulation** of a multibody system for solving the **closed-loop rigid-flexible system** is introduced for the first time.
- ▶ The method allows one to develop **recursive forward dynamic formulation** by **cutting** an appropriate joint of the closed-loop system under study to form several open-loop subsystems.
- ▶ The formulation is illustrated with a rigid-flexible four-bar mechanism considering the output-link flexible



Some places in Busan



Some what fun...



Returning back to INDIA



Acknowledgement

- ▶ Prof. S. K. Saha for guiding me and encouraging me to write the paper.
- ▶ Prof. O.A. Bauchau for guiding me (while I was in China) and co-authoring the paper
- ▶ All my lab-mates from Mechatronics and PAR lab and Jaitly Sir for helping me in every step in travel preparation.
- ▶ Finally, DST for providing me the International travel grant.



THANK YOU