TOP@IMSD

Dec. 15, 2023

TOP: Team-based Online Projects; **IMSD**: The International Society for Multibody System Dynamics

Objectives:

- The main objective of the TOP mechanism is to increase the interest of the participants in a topic (say, Multibody System Dynamics) during the program of, say, a few months.
- To enhance people-to-people contact and to make the next generation more employable and professional.

Benefits to the participants:

- Each participant will get to know at least 3-5 colleagues from other colleges/countries.
- Practice how to work together in a team.
- Learn how to make presentations in a team.
- The above interaction may lead to future collaboration in terms of visiting each other's institute, helping each other in procuring equipment/creating syllabus, writing joint paper, guiding students jointly, writing sponsored projects, etc.
- Comparing one's abilities (to build confidence or to know more hard work is required) within the team.
- Peer learning from the evaluation of other teams' work.

Benefits to Organizers/ Sponsors/Country:

- Improvement of the professional attitude of the participants towards their teaching/learning abilities by actively engaging themselves in the process, instead of just listening to the lectures.
- Preparing participants to assimilate knowledge in Multibody Dynamics (MBD) through global partnership.

Steps in TOP:

- **Step 1 (Project Selection):** The teams will work on one of the few projects mentioned below.
- **Step 2: (Regular Meetings):** It is expected that over a period of few months the team members MUST spend at least 2-3 hours together every week physically/online/phone to monitor progress.
- **Step 3 (Presentation):** Upload their presentations with not more than 6 slides (.pdf file) before a specified date.
- **Step 4 (Peer Review):** Review of the presentations will be made (online) by the next two teams. For example, Team 1 will be evaluated by Teams 2, 3, and score out of 50 before the deadline.
- **Step 5 (Final Evaluation):** Final online evaluation will be done at the end in the presence of an expert group.

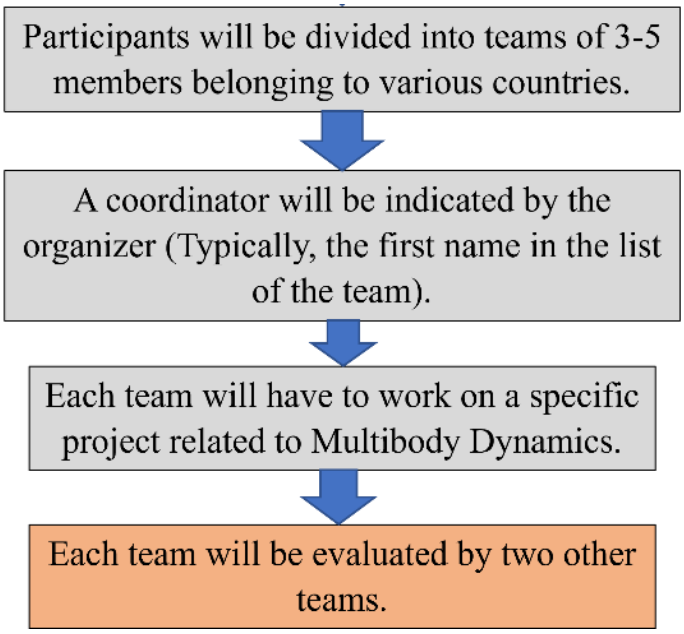

Fig. 1. Flow Chart of TOP Mechanism

Rules:

- One team consists of 3-5 members.
- The first member of each team is the team coordinator by default.
- Participants must choose their topic from the contents given at the end.
- It is advised to participants that over the period of the program, the team members must spend about 2-3 hrs. together every week physically/online/phone to decide what they would do or discuss their progress.
- Presentations with not be more than 6 slides (.pdf file), which needs to be uploaded by the specified date.
- Presentations in .pdf format will be evaluated (online) by the next 2 teams. For example, Team 1 will be evaluated by Teams 2, and 3, and scores out of 50. They will be uploaded in a Google Form.
- Final presentations/interactions will be done on another specified date in front of experts. Each team may get about 5-10 mins to present. Depending upon the team size the presentation time can be varied.
- Surprise gift/award (say, book coupons, etc.) may be considered by the organizer based on the sponsorships available.

Important Dates*:

- Call for TOP@IMSD: **Dec. 15, 2023**
- Registration last date (Using Google Form): **Jan. 7, 2024**
- Formation of Teams: **Jan 31, 2024**
- Project Activities: **Feb. 01-Apr. 30, 2024**
- Submission of Presentations (6 slides): **Apr 30, 2024**
- Peer Review: **May 15, 2024**
- Final Presentation**: May end, 2024 (To be announced later)**

- Online meeting for doubt clearing: **Jan. 3rd week, 2024**

***** Subjected to change, if required.

Organizing Team
Prof. S.K. Saha, IIT Delhi (Chairperson, IMSD)
Mr. Sandeep Kumar, IIT Delhi

Contact:
Kindly contact topimsd@gmail.com for any clarification regarding the program.

Problems for TOP@IMSD

[Source: Library of Computational Benchmark Problems, IFToMM Technical Committee for Multibody Dynamics, accessed on Oct. 9, 2023]

The following (benchmarks) problems are from the source "Library of Computational Benchmark Problems, IFToMM Technical Committee for Multibody Dynamics". The participants are requested to validate the results. This way, we can popularize such benchmark problems.

1. Sensitivity analysis of a five-bar mechanism (For link: Click here)
2. 3D simple pendulum (For link: Click here)
3. Wheel on tipping table (For link: Click here)
4. Linearized bicycle (For link: Click here)
5. Four-bar linkage with diagonal spring and damper (For link: Click here)
6. Stiff flyball governor (For link: Click here)
7. Gait 2D (For link: Click here)
8. Double four bar mechanism (For link: click here)
9. Spatial rigid slider-crank mechanism (For link: Click here)
10. Multiple four-bar mechanism (For link: Click here)
11. Rectangular Bricard mechanism (For link: Click here)
12. Andrews' squeezer mechanism (For link: click here)
13. Uncontrolled bicycle (For link: Click here)
14. Planar Jansen mechanism (For link: Click here)
15. Sensitivity analysis of a double lane change maneuver of a buggy vehicle (For link: Click here)
16. Sensitivity analysis of a step descent maneuver of a buggy vehicle (For link: Click here)

Project Example from previous TOP: Kindly see the Appendix in a separate file.