**ME370: ADAMS LAB**

**Department of Mechanical Engineering,**

**IIT Bombay**



**Session 7 Report**

**Group / Section:** A8

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**Roll Number:** 200020023



**Date:** March 17,2023

**Given Information**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Roll Number | Coordinates of Joints (mm) | | | | | | | | | | | | |
| 200020023 | A(x) | A(y) | | | B(x) | B(y) | | C(x) | C(y) | | D(x) | | D(y) |
| Question 1 Data | 8 | 6 | | | -54 | 110 | | 314 | 316 | | 294 | | 12 |
| Question 2 Data | Ball Diameter (cm) | | Ball Mass (X kg) | Vertical Distance between Centre of Ball and Centre of Basket (Y cm) | | | Horizontal Distance between Centre of Ball and Centre of Basket (Z cm) | | | Torus Major Diameter (cm) | | Torus Minor Diameter (cm) | |
| 14 | | 19 | 67 | | | 90 | | | 21 | | 19 | |

**Question 1 (Crank Rocker Mechanism)**

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| **FRONT VIEW OFCRANK ROCKER MECHANISM** |
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| **TRANSMISSION ANGLE WITH TIME** |
|  |

**INPUTS:**

**2**

* The maximum change in coordinate positions of B and C is constrained to 15%.

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| --- | --- | --- |
| **SENSITIVITY ANALYSIS** | | |
| **JOINT** | **IMAGE** | **AVERAGE SENSITIVITY** |
| B(x) |  | 0.18637 |
| B(y) |  | 0.06482 |
| C(x) |  | -0.05006 |
| C(y) |  | 0.03740 |

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| **POSITION OPTIMISATION ANALYSIS** |
|  |

**OUTPUTS:**

**2**

* The magnitude of sensitivity at different joints is according to the order:B(x)>B(y)>C(x)>C(y)
* The optimum positions of B and C which will give the maximum value for the minimum transmission angle encountered during a crank rotation have been indicated in Optimization Summary.

|  |  |  |
| --- | --- | --- |
| Maximum Value of Minimum Transmission Angle | Optimum coordinates of Joint B | Optimum coordinates of Joint C |
| 27.059 | (-45.9,126.5) | (266.9,363.4) |

**Question 2 (Basketball Hoop Problem)**

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| **FRONT VIEW OF BALL AND BASKET** |
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| **POSITION & VELOCITY OPTIMISATION ANALYSIS** |
|  |

**OUTPUTS:**

**2**

|  |  |  |
| --- | --- | --- |
| Optimum X Velocity | Optimum Y Velocity | Optimum Z Velocity |
| 1.514 m/s | 3.917 m/s | 0 |

—X—X—X—X—X—X—X—X—**END**—X—X—X—X—X—X—X—X—