

M.Sc. Thesis Proposal

Compliant Overrunning Clutch in Application of Micro Transmission Mechanisms



Figure 1. Sandia overrunning clutch

Challenge: Design a compliant overrunning clutch to convert a translational motion as input into a full cycle rotational motion as output with a fixed ratio. The candidate will generate design concept, and demonstrate proof-of-concept through a series of macro & micro prototypes.

Background: In some applications, a micro mechanical transmission system is desired in order to convert the reciprocating motion into the slower full cycle rotational output motion with a fixed ratio. Different linkage based mechanisms exist in prior art in order to transform the translational input motion into the full cycle rotational output motion such as crank slider linkage, Scotch Yoke, and etc. However, these linkages cannot change the motion frequency.

Mechanical Overrunning clutches show a great potential in order to achieve this goal. However, most of them are rigid-body mechanisms or semi compliant, Sandia overrunning clutch **Figure 1**. This project aims to design a fully compliant motion conversion device with a fixed ratio based on overrunning clutches and ideally remove the bearing of the output wheel.

Opportunities: Research development, Design experience using macro & micro fabrication techniques, Finite Elements – ANSYS/COMSOL, close collaboration with an international company, and publishing papers.

Who are we? We are interactive mechanisms and mechatronics group at Precision and Microsystems Engineering (PME) department.

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