Tri-Pyramid Robot: A Novel 3-DOF Translational Parallel Manipulator

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Short Description
A novel 3-DOF translational parallel manipulator with high output stiffness and accuracy

Abstracts
Northwestern’s researchers have developed a novel 3-DOF (Degree of Freedom) translational manipulator called tri-pyramid robot. Capable of manipulating an objective in space by generating translational output in three directions, the 3-DOF translational manipulators are widely used in industry. However, most current 3-DOF translational manipulators have limited output stiffness and accuracy. To overcome these disadvantages, the tri-pyramid robot is developed using novel topology to achieve high structure load/weight-ratio and output accuracy. With the improved operating speed, output stiffness and precision compared with existing systems, the tri-pyramid robot is promising for various industrial applications, such as machining, precision positioning, and operations of robotic arms.

Applications
- High stiffness/accuracy fabrication machines, such as milling or metal forming
- High-speed pick and place operations
- Precision positioning
- Robotic arms

Advantages
- High output stiffness and accuracy
- High operating speed and dexterity
- High load/weight ratio
- Free of motion singularity

Figure: Structure design of the tri-pyramid robot
Publication

IP Status
US provisional patent application has been filed

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