One motor actuates multiple degrees of freedom.

As robotics applications become increasingly sophisticated and seek to mimic human motions, they require increasingly advanced systems that can efficiently actuate multiple degrees of freedom. Conventional systems require one electric motor per degree of freedom and are large, heavy, and expensive. One-to-Many (OTM) systems enable a single motor to store potential energy that can drive multiple independently actuated and controlled degrees of freedom. These lightweight, portable, cost effective, and energy efficient systems can be used in a wide variety of applications including actuators and robotic systems in the aerospace field, underwater applications, ground transportation (power amplification in cars or motorcycles), sports, exercise, entertainment, 3D internet with force feedback, or teleoperation.

Features
- Single motor outputs multiple independent degrees of freedom through the connection of modules
- Elastic elements passively store potential energy until it is needed for actuation
- Lightweight, high speed, energy efficient, and robust clutches that can be miniaturized
- Available in linear and rotary systems with customizable elements

Benefits
- Reduced size, cost, and energy consumption
- Power is not limited by the maximum output power of the motor due to energy storage capabilities
- Architecture can easily integrate with many existing devices or can be used in custom systems

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