

ROTARY ELASTIC COUPLING, ACTUATOR AND CONTROL METHOD

ABSTRACT

A rotary elastic actuator includes first and second flywheels mounted about an axis for rotation relative to each other; a pair of linear elastic elements, each having opposing ends. One of the opposing ends of each of the linear elastic elements is mounted to the first flywheel; while the other one of the opposing ends of each of the linear elastic elements mounted to the second flywheel. The pair of linear elastic elements are mounted to bias the first and second flywheels towards an angular equilibrium position relative to each other about the axis of rotation and to exert a net torque about the axis and toward the position of equilibrium, as the discs are rotated angular distances in either direction away from the angular equilibrium position. The actuator may further include a motor operatively connected to the first flywheel for rotating the first flywheel; and a sensor for generating signals indicative of angular positions of the first and second flywheels. A controller may then be operatively connected to the motor and the sensor for controlling the output of the motor based on the signals. An exemplary method of controlling this actuator includes measuring relative angular displacement between the first and second flywheels to assess torque provided through the coupling and controlling the motor based on the measured angular displacement.

Fig. 2A