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TITLE

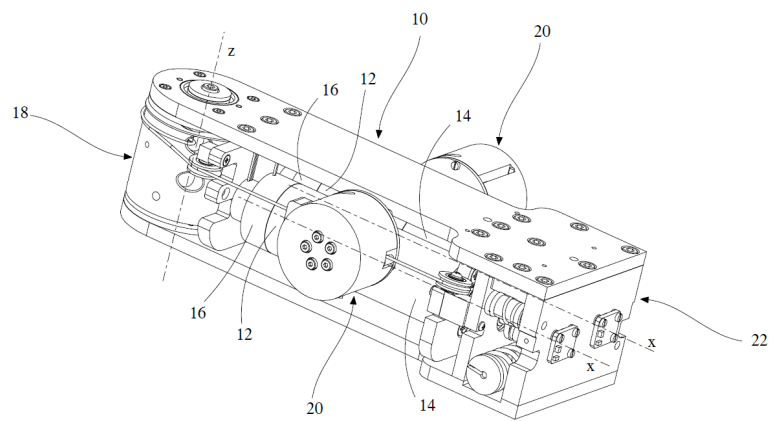
Variable-stiffness actuator with passive disturbance rejection

INVENTORS

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DESCRIPTION

This patent concerns the design of a novel type of passive variable impedance actuator aimed at replicating a specific property of human co-contraction, related to the ability to cope with uncertainties affecting any physical/biological system. The designed actuator is well-suited to mimic the main features of human co-contraction. In particular, the dynamical model of this actuator is such that the variance of the state vector in response to noisy disturbances can be reduced by tuning the passive stiffness of the system. A practical example of such an actuation system is based upon non-linear springs (to regulate the stiffness) with the critical feature of attaching some elastic elements to a fixed reference/ground (to reject disturbances to a desired extent). The antagonist actuator structure is actually analog to Hill's model of the human muscle/tendon system, emphasizing its biological relevance.



APPLICATIONS

This solution finds application in all those systems which require direct interaction of the robot with the human and environment, e.g. service/entertainments/rehabilitation/human-centred robotics, exoskeletons and medical devices.

KEYWORDS

Noise rejection, variable stiffness actuator, robotics, human-centred robotics

BIBLIOGRAPHIC DATA

Attuatore a rigidità variabile con reiezione passiva dei disturbi

First Filing Application Number TO2012A000743

Application Date August 28, 2012

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