Exam- questions- English

Couplings

A flexible coupling (bellows) makes it possible to

- [ ] Correct the alignment between the axes to be coupled
- [ ] To improve the guidance of the axes to be coupled
- [ ] To reduce the play between the two axes to be coupled
- [ ] To reduce the inertia of the transmission
- [ ] None of the other proposals

Choice transmission

For the realization of a machine tool axis of 400mm, you recommend a transmission:

- ○ with a rigid belt TCH-XX
- ○ screw
- ○ with rack
- ○ None of the other proposals

Choice of transmission

For the implementation of the axes of a machine of laser cutting of 2mX3m, it is preferable to use:

- ○ A belt
- ○ Screw transmission
- ○ Rack-pinion transmission
- ○ Connecting rod transmission
- ○ Cable transmission

Direct drive

A direct drive axis (direct actuation) is a motorized axis without reducer. Check the correct answer(s)

- [ ] A DD is more sensitive to external disturbances
- [ ] A solution with DD axes induces more mechanical noise and requires lubrication
- [ ] The absence of a reduction gear induces better mechanical reliability.
- [ ] The absence of a reducer makes the system more fragile.
- [ ] A DD solution has a better natural frequency

Exam- questions- English

Ball guideways

The balls of a recirculating ball guide

- [ ] reduce friction
- [ ] improve rigidity
- [ ] reduce manufacturing costs
- [ ] make the implementation more compact

Guideways

For the implementation of a linear guide with a small stroke (<10 mm) and without backlash, it is preferable to use:

- ( ) A guide with flexible blades
- ( ) A guide with ball bearings
- ( ) An Igus smooth guide
- ( ) A Hydrostatic guide
- ( ) None of the other proposals

Backlash

Consider a planetary gearbox with 1 degree of mechanical backlash, controlling a 300 mm long arm- The backlash at the tip of the arm is approximately:

- ( ) 5 mm
- ( ) 1.67 mm
- ( ) 300 microns
- ( ) 10 mm

Materials

To improve the eigen frequency of an arm, it is preferable to choose

- [ ] An aluminum alloy
- [ ] A steel alloy
- [ ] A Magnesium alloy
- [ ] A Titanium alloy
- [ ] The choice is not decisive

Exam- questions- English

Reducers

For the implementation of a rotary axis without backlash, it is recommended to use:

- [ ] a Harmonic Drive reducer, if the reduction ratio is low
- [ ] a Harmonic Drive reducer, if the reduction ratio is high
- [ ] a belt reducer, if the reduction ratio is low
- [ ] a belt reducer, if the reduction ratio is high

Spring

A spring mechanism is recommended in a screw transmission to

- ○ reduce the mechanical play in the transmission
- ○ reduce the friction in the transmission
- ○ increase the natural frequency of the mechanism
- ○ make the system oscillatory

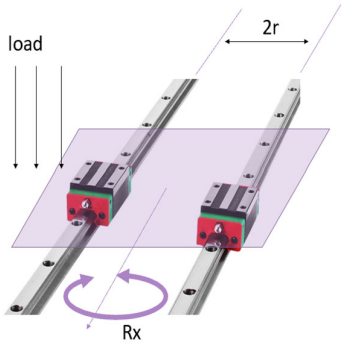
Spring

The use of a preload spring induces the following behavior(s)

- [ ] It increases the friction in the mechanism
- [ ] It reduces the friction in the mechanism
- [ ] It reduces the mechanical backlash in the mechanism
- [ ] It makes the mechanism simpler

Rigidity - guideways

Given the construction of a guide with double linear rails, distant by (2 r)

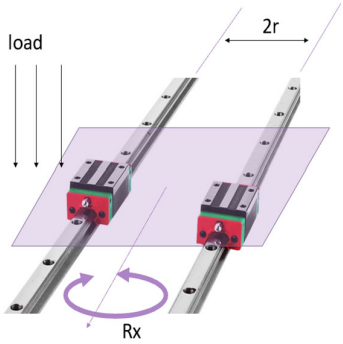


The torsional stiffness (in the Rx direction) is then:

- Proportional to r^2
- Proportional to r
- inversely proportional to r^2
- inversely proportional to r

Rigidity - guideways

Given the construction of a guide with double linear rails, distant by (2 r)



This construction has the following characteristics:

- [ ] Allows better torsional rigidity in the Rx axis
- [ ] Allows better rigidity in the vertical direction
- [ ] Allows better torsional rigidity in the axis Rx but weakens the stiffness in the direction of the load.
- [ ] Allows better rigidity in the direction of the load but weakens the torsional rigidity in the Rx axis
- [ ] Is hyperguided

Cable transmission

A cable transmission is recommended in the implementation of haptic devices because of

- [ ] its very good mechanical performance
- [ ] its very good reversibility
- [ ] its very low friction
- [ ] its very compact implementation
- [ ] The stiffness of the cable

Exam- questions- English

Belt transmission

A belt transmission is recommended in the case of:

- rapid
- movements precise
- movements movements requiring great forces

rack-and-pinion

A rack-pinion transmissionAis recommended for:

- rapid movements
- precise movements
- movements requiring great forces

screw

A Screw transmission is recommended for:

- rapid movements
- precise movements
- movements requiring great forces

Ball screws

Ball screw transmissions allow to:

- Reduce the manufacturing cost
- Improve the compactness of the screw
- Reduce the s friction
- Improves mechanical reversibility
- None of the other proposals.

Biocompatible materials

Stainless steel is biocompatible

- True
- False

Exam- questions- English

Quality factor

Quality factor introduced by Dr. Marc Olivier Demaurex makes it possible to compare the performance of robots regardless of their size.

- True
- False

Ball guideways

The balls of a recirculating ball guide reduce friction.

- True
- False

Materials

For the construction of a rigid arm, a steel alloy is preferable to an aluminum alloy

- True
- False

Precision

The higher the natural frequency, the better the positioning precision of a robot arm .

- True
- False

Precision

For reducing the positioning error of a robot arm, a bang-bang acceleration profile is better than a sinusoidal acceleration profile

- True
- False

Reducers

A planetary gearhead can achieve higher reduction ratios than a Harmonic Drive

- True
- False

Exam- questions- English

Reducers

A Harmonic Drive reducer is more rigid than a planetary reducer

- True
- False

Springs

A spring is recommended to dampen oscillatory behavior,

- True
- False

Trajectories

The profile acceleration has no effect on the position accuracy of a robot arm.

- True
- False

Cable transmissions

A cable transmission is recommended in the implementation of haptic devices

- True
- False

Cable transmissions

Cable and belt transmissions have comparable efficiencies

- True
- False

Ball screws

Ball screw transmissions are chosen because of their lower manufacturing cost

- True
- False