RSPU Generalized Coordinates

A = revolute R B = spherical S C = prismatic P, universal U

**y**

**a**

**b**

**c**

**C**

**B**

**O**

****

**A**

**z**

**d**

**x**

**D**

a = OA = ground (20.43 cm)

b = AB = input crank (4.00 cm)

in y-z plane

c = OC = ground (19.97 cm)

d = BC = variable

lenBD = square rod (35 cm)

 = crank angle in y-z plane

**y1’**

**O**

**z4’**

**y4’**

**C**

**x4’**

**4**

**x2’**

**z2’**

**y2’**

****

**B**

**A**

**2**

**A**

**z1’**

**C**

**3**

**y3’**

**x3’**

**B**

**z3’**

**x4’’**

**x1’**

**CONSTRAINTS**

**D**



# CONSTANTS

# 

# 

**INITIAL ESTIMATES**









# FIXED REVOLUTE DRIVER

****

**z1’**

**y2’**

**z2’**

****



# OUTPUT











# JACOBIAN



**VELOCITY**



**ACCELERATION**







**JERK**











RSPU - Inertial Properties

link 2

**x2’**

**z2’**

**y2’**

****

**B**

**A**

**2**

density = 1.18 g/cm3 plexiglass

diameter D = 5 inch = 12.7 cm

t = 0.5 inch = 1.27 cm

189.84 g = 0.18984 kg

3.8274 kg.cm2

1.9177 kg.cm2

1.9177 kg.cm2

link 3

**D**

**3**

**y3’ old**

**x3’ old**

**B**

**z3’**

**y3’**

**x3’**

density = 1.18 g/cm3 plexiglass

square rod width w = 0.5 inch = 1.27 cm

length L = lenBD = 35 cm

66.61 g = 0.06661 kg

6.8000 kg.cm2

6.8000 kg.cm2

0.017906 kg.cm2

shift centroid 

initial estimate 

**z4’**

**y4’**

**C**

**x4’**

**remains**

**horizontal**

**4**

link 4

density = 1.18 g/cm3 plexiglass

cube width w = 2.5 inch = 6.35 cm

302.14 g = 0.30214 kg (ignore hole)

2.0305 kg.cm2

2.0305 kg.cm2

2.0305 kg.cm2