task3

October 6, 2022

1 RO:

The system consists of 4 rigid bodies 1, 2, 3, ABCD

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2 Motion:

1, 2, 3, ABCD - translatory motion

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3 Condition:

$initial$	$'2'$	$final$
$x_{c0} = x_c$	$x_{c2} = x_c$	$x_{cf} = x_c$
$x_{10} = x_1$	$x_{12} = x_1 + s$	$x_{1f} - ?$
$x_{20} = x_2$	$x_{22} = x_2 + s - l$	$x_{2f} - ?$
$x_{30} = x_3$	$x_{32} = x_3 + s - l * cos(60)$	$x_{3f} - ?$
$x_{40} = x_4$	$x_{42} = x_4 + s$	$x_{4f} - ?$

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4 Solution

$$x_c = \frac{M_1 x_1 + M_2 x_2 + M_3 x_3 + M_4 x_4}{M_1 + M_2 + M_3 + M_4}$$

$$x_c = \frac{M_1(x_1 + s) + M_2(x_2 + s - l) + M_3(x_3 + s - lcos(60)) + M_4(x_4 + s)}{M_1 + M_2 + M_3 + M_4}$$

$$s = \frac{M_2 l + M_3 lcos(60)}{M_1 + M_2 + M_3 + M_4}$$

[ ]:
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import numpy as np

# Paste here the value of m4 (body ABCD)!
m4 = ?
l = 1
m1 = 20
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m2 = 15
m3 = 10
s = (m2 * l + m3 * l * np.cos(np.pi / 3)) / (m1 + m2 + m3)
print(f's = {s}')
```