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1 % Sounak Ghosh
2 % 9/8/19
3 % ECE 202 - Fall 2019 - MATLAB Exercise M1
4 % Equation source: http://www.convertalot.com/elastic\_collision\_calculator.html
5 % MATLAB script to determine the final velocities of 2 carts after an
6 % elastic collision.
7
8
9 clear % clears all variables in the workplace; avoids common errors
10
11 % ----- given information -----
12
13 m1 = 250; % mass of the cart#1 in g
14 m2 = 150; % mass of the cart#2 in g
15 v1i = 40; % initial velocity of cart#1 in cm/s
16 v2i = -30; % initial velocity of cart#2 in cm/s
17
18 % ----- calculations -----
19 % (a)
20
21
22 v1f = ((m1 - m2)*v1i + 2*m2*v2i)/(m1 + m2); % final velocity of cart#1 in cm/s
23 % using momentum conservation
24 % and kinetic energy
25 % conservation
26
27 v2f = (2*m1*v1i - (m1 - m2)*v2i)/(m1 + m2); % final velocity of cart#2 in cm/s
28 % using momentum conservation
29 % and kinetic energy
30 % conservation
31
32 % ----- check answers -----
33
34 check_p = (m1*v1f + m2*v2f) - (m1*v1i + m2*v2i); % The change in the total
35 % momentum of the system
36 % before & after the
37 % collision should be
38 % zero.
39 check_Energy = ((0.5*m1*(v1f)^2) + (0.5*m2*(v2f)^2)) - ((0.5*m1*(v1i)^2) + (0.5*m2*(v2i)^2));
40 % The change in the total
41 % energy of the system
42 % before & after the
43 % collision should be
44 % zero.
45
46
```

```
>> M1  
>>
```

Name 	Value
 check_Energy	0
 check_p	0
 m1	250
 m2	150
 v1f	-12.5000
 v1i	40
 v2f	57.5000
 v2i	-30