

I-138

In the farthest reaches of deep space, a spaceship of mass M , including contents, is at rest relative to a space station. The spaceship recoils after it launches a scientific probe of mass m at a speed v relative to the space station. Determine the recoil speed of the spaceship (V) as a function of M , m , and v .

Free-Body Diagrams

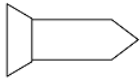
Mathematical Analysis

spaceship

probe

Event 1:

Event 2:



Questions

If $M = 2m$, what should V equal? Does your function agree with this observation?

If $M = \infty$, what should V equal? Does your function agree with this observation?

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