

Re: finding escape velocity

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"kiran" <kiranlimaye11@xxxxxxxxxx> wrote in message
news:06e44eab-2fd9-4743-93e1-846489173300@xx

i am trying to make differential equation such that by his general solution i can get value of escape velocity or velocity with which rocket should be fired such that it won't return to the earth. assumption for external force is only gravitational force. no air resistance.

You could go the long route and start with the general equation of motion

$$r'' + \frac{u}{R^3} * r = 0$$

where $R = |r|$, $u = G * M * m \approx GM$

then derive the conservaton of mechanical energy from it, yielding $E = v^2 / 2 - u/r$

The rocket orbit will be:

E Trajectory

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<0 Circular or Elliptical (less than escape velocity)

=0 Parabolic (unbound, escape velocity)

0 Hyperbolic (unbound, greater than escape velocity)

Setting $E = 0$ then,

$$0 = v^2/2 - u/r$$

$$v = \sqrt{2u/r}$$