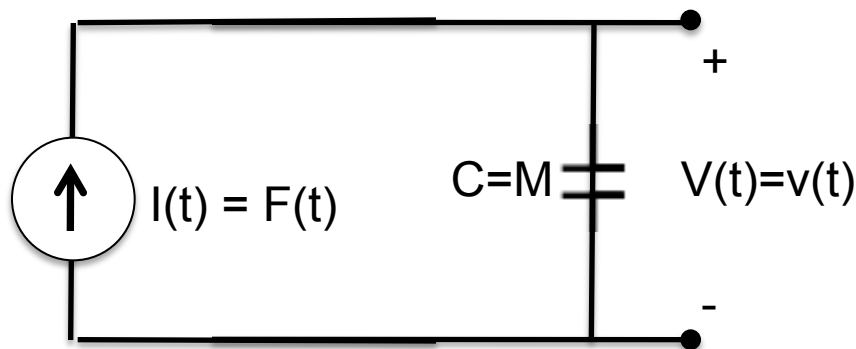


## Answers

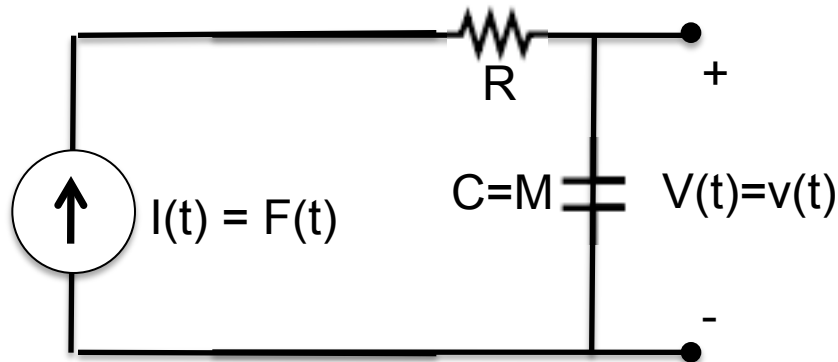
Without friction, the system is LTI and can easily be modeled as a simple integrator.

$$v(t) = \frac{1}{M} \int_{-\infty}^t (F(t')) dt'$$

For the equivalent circuit, let current,  $I(t)$ , equal  $F(t)$  and the voltage,  $V(t)$ , equal  $v(t)$ , then the equivalent circuit is...



However, for a stone block on a table, there is friction, in which case the system is clearly nonlinear. Try pushing the block very lightly and observing the output. One might be tempted to try the following RC model.



Unfortunately, a resistor is a device such that voltage and current are linearly proportional ( $V=IR$ ), clearly not the case with respect to kinetic friction. Hence the RC model is wrong.