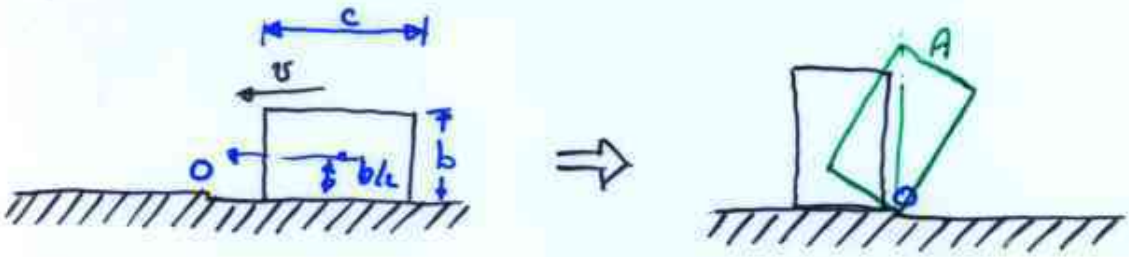
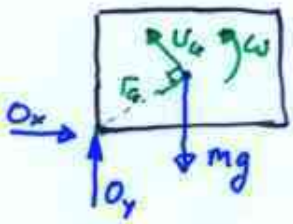
UNIFORM BLOCK SLIDING to LEFT strikes a small step as shown. FIND minimum v s.t. BLOCK CAN PIVOT AND reach STANDING POSN A SHOWN w/ no velocity & % energy loss if $b=c$



FREE BODY DIAGRAM



INITIAL ANGULAR MOMENTUM... just before impact

$$H_{O_1} = mv\left(\frac{b}{2}\right)$$

JUST AFTER IMPACT...

vel of c.o.g. is v_G as SHOWN on F.B.D.

ang vel is $\omega = v_G/r_G$ $\qquad H_O = I_O\omega$

$$\Rightarrow H_{O_2} = \left(\underbrace{\frac{1}{12}m(b^2+c^2)}_{I_G} + \underbrace{m\left[\left(\frac{c}{2}\right)^2+\left(\frac{b}{2}\right)^2\right]}_{(r_G)^2}\right)\omega \qquad I_O$$

$$= \frac{m}{3}(b^2+c^2)\omega \simeq I_O\omega$$

NEGLECT ANGULAR IMPULSE OF WEIGHT (TIME of collision is short so $\int_1^2 mg\,dt$ will be small).

$\Rightarrow$ Apply CONSERVATION of MOMENTUM... $\Delta H_O = 0$

$$\Rightarrow \frac{m}{3}(b^2+c^2)\omega = mv\left(\frac{b}{2}\right) \Rightarrow \boxed{\omega = \frac{3vb}{2(b^2+c^2)}}\ *$$