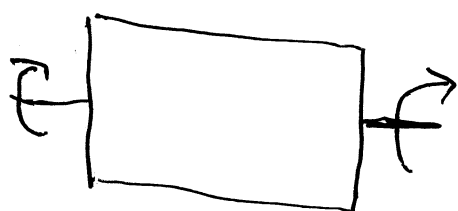


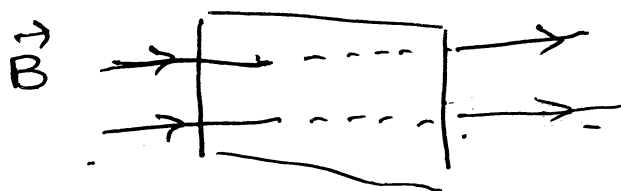
PROBLEM SET 8 - 2019

1. Consider a square loop of wire able to be rotated as shown below



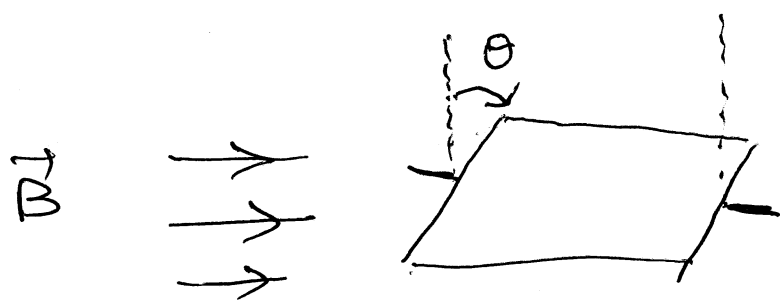
(a) Suppose there is a magnetic field $\vec{B}$ which is constant in magnitude and direction.

Suppose the current loop is initially oriented so that it is perpendicular to the magnetic field:



If the area of the loop is A , what is the magnetic flux Φ through the loop?

(b) Suppose the loop is rotated by an angle θ in the direction shown, but the direction of the $\vec{B}$ field is unchanged. What is the flux of the magnetic flux Φ through the loop?



(c) Suppose the loop is rotating with an angular speed ω , so that $\theta(t) = \omega t$.

What is the magnitude of the EMF induced in the loop?

(Use $|\mathcal{E}| = \left| \frac{d\Phi(t)}{dt} \right|$)