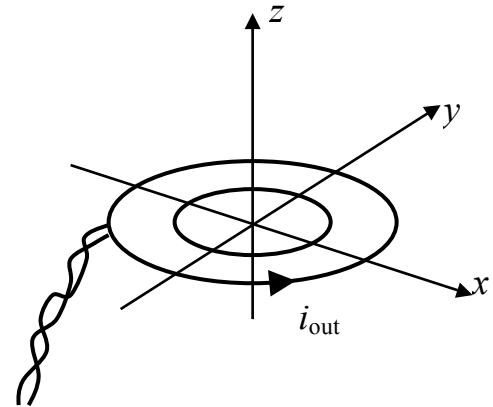


Physics 125: Analytical Physics II “No Risk” Quiz

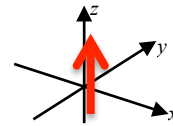
The picture shows two loops of wire in the same plane and with the same center. Wires connected to the outer one are driving a current around the outer loop in the direction shown.

However, the external source is failing, and the current i_{out} is *decreasing*.



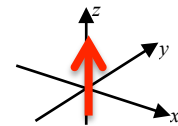
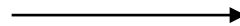
On the following small axes, draw vectors or arrows representing the direction and relative magnitudes of...

- (a) ... the magnetic field at the origin due to the outer loop,



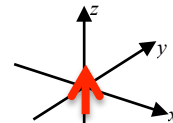
curl-straight-RHR from the outer loop current

- (b) ... the external magnetic flux through the inner loop at some early time,



perpendicular to the inner loop (the one “feeling” the flux), with same sense as (a).

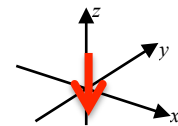
- (c) ... the external magnetic flux through the inner loop a little later than for (b),



(represent relative magnitude as well as direction)

like (b), but smaller (i_{out} decreasing \rightarrow field smaller)

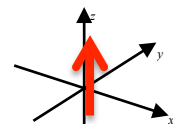
- (d) ... the change in that magnetic flux from earlier and to later times,



from big (b) to small (c), like vector subtraction

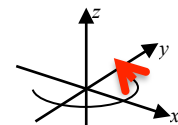
you CANNOT get this from (b) or (c) alone, only together

- (e) ... the induced magnetic field that will be caused by the inner loop,



Lenz’s Law says: reverse (d) to get this

- (f) ... and the induced current in the inner loop. Indicate this direction by putting an arrowhead at the appropriate end of the **given arc**.



curl-straight-RHR from part (e)