

Physics Cup 2018 - Problem 3. March 4, 2018

Find the inductance of a circular loop of wire around an infinite ferromagnetic cylinder of radius r . The cylinder is made from a ferromagnetic material of relative permeability $\mu \gg 1$ (if needed, you can also assume that $\ln \mu \gg 1$); the radius of the loop is slightly larger than r so that it sits tightly around the cylinder.

First hint, March 4, 2018. Keep in mind fact IX-30 from <https://www.ioc.ee/~kalda/ipho/formulas.pdf>. Also, it might be somewhat useful to read the solutions of <http://www.ipho2012.ee/physicscup/problem-no-2/>, see <http://www.ipho2012.ee/physicscup/problem-no-2/solution/>.