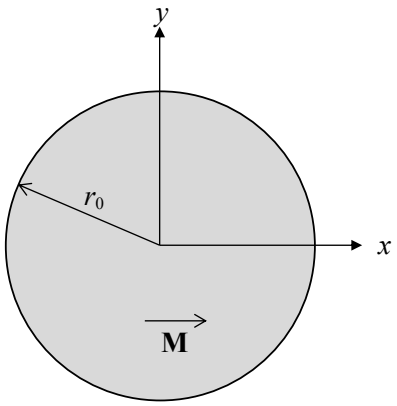
2. **Moving Bar Magnet**



(a) A long cylinder of radius r_0 has uniform permanent magnetization density $\mathbf{M}$ perpendicular to the axis of the cylinder. Find the fields $\mathbf{B}$ and $\mathbf{H}$ everywhere. Let $\hat{z}$ =axis of the cylinder, and $\mathbf{M} = M\hat{x}$ as shown.

(b) Suppose the cylinder is given uniform velocity $\mathbf{v} = v\hat{z}$ along its axis. Find the resulting charge density and electric field everywhere. You may ignore effects of order $(v/c)^2$.