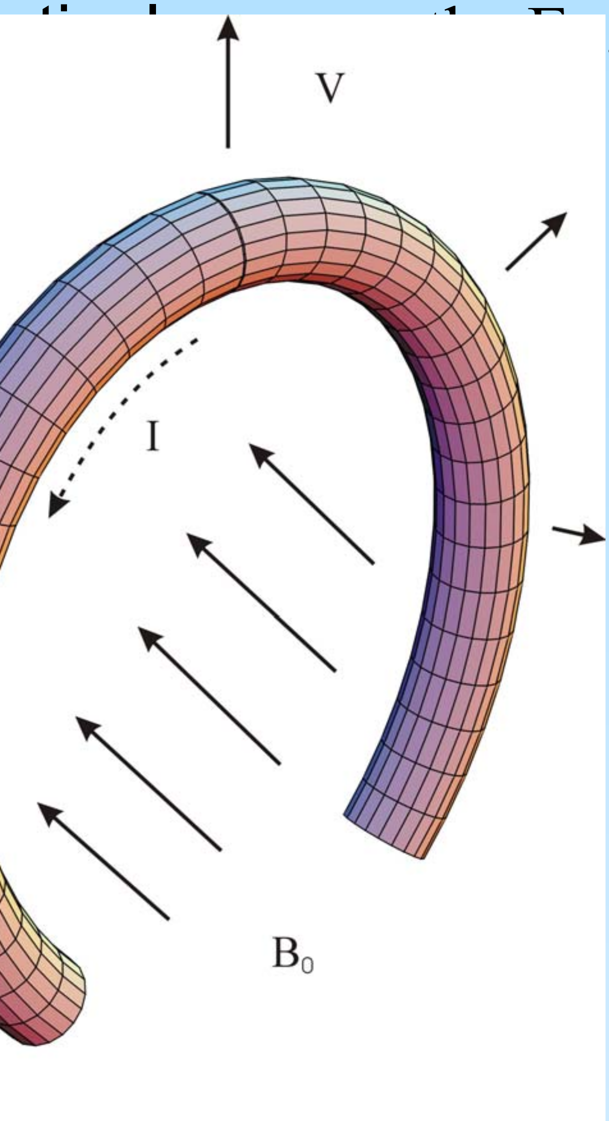
c loop doesn't move and only a new magnetic
s below it. Equally, one can consider a situation wh
netic loop grows up and the space blow it is filled wit
c field newly emerging from below the photosphere



rising in a constant magnetic field

$$\frac{d}{dt}\left(IR_{loop}\left(Ln\frac{8R_{loop}}{r_0}-\frac{7}{4}\right)\right) = -a_1 IR_{loop} - a_2 R_{loop}\frac{dR_{loop}}{dt}$$

where
$$a_1 = \frac{c^2}{2\pi\sigma(T)r_0^2}, \qquad a_2 = \frac{B_0 c}{2\pi}.$$

Taking a $\left(Ln\frac{8R_{loop}}{r_0}-\frac{7}{4}\right)$ v variation of the term the Eq.(2) ca

$$\frac{d}{dt}(IR_{loop}) = -b_1 IR_{loop} - b_2 R_{loop}\frac{dR_{loop}}{dt},$$

$$b_1 = \frac{c^2}{2\pi 9\cdot 10^6 T^{3/2} r_0^2}\left(Ln\frac{8R^0_{loop}}{r_0}-\frac{7}{4}\right)^{-1}, \quad b_2 = \frac{B_0 c}{2\pi}\left(Ln\frac{8R^0_{loop}}{r_0} -\right.$$

nitial condition $I(t=0) = 0$ and $R_{loop}(t) = R^0_{loop} + a\,t$ the Eq.
lved analytically