MAGNETIC FIELD TWIST DRIVEN BY REMOTE CONVECTIVE MOTIONS: CHARACTERISTICS AND TWIST RATES

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It is generally believed that convective motions below the solar photosphere induce a twist in the coronal magnetic field as a result of frozen-in physics. A question of interest is how much twist can one expect from a persistent convective motion, given the fact that dissipative effects will eventually figure. We examine this question by considering a model problem: two conducting plates, with finite resistivity, are set in sheared motion and forced at constant relative speed. A resistive plasma is between the plates and an initially vertical magnetic field connects the plates. The time rate of tilt experienced by the field is obtained as a function of Hartmann number and the resistivity ratio. Both analytical and numerical approaches are considered.