**M05b**    **Derivation of dBz/dz from Stokes Profiles and its Application to Azimuth Ambiguity Resolution**

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We derived longitudinal gradient of magnetic field strength (dBz/dz) from Stokes profiles by using Artificial Neural Networks (ANN) and used it for resolving azimuth angle ambiguity of magnetic field with a simple algorithm. ANN can infer physical quantities from Stokes profiles with exceptionally high speed compared to ordinary inversion codes. Carroll and Staude (2001) and Socas-Navarro (2005) demonstrated that ANN can obtain vector magnetic field components and Doppler velocities.

We constructed an ANN to derive dBz/dz component from Stokes profiles by training it with a synthesized data set of 16000 profiles. Its evaluation with synthesized profiles indicates that three-layer ANN can determine the sign of dBz/dz with 90% accuracy, though simpler two-layer ANN failed to achieve that. High quality Stokes profiles obtained with Spectro-Polarimeter (SP) on board *Hinode* were processed with the ANN.

Once the sign of dBz/dz is determined from Stokes profile, gradients of horizontal components can be estimated from the equation $\nabla B = 0$. We compare the results with that of potential field extrapolation method and discuss the advantages and disadvantages of this method.