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Direct Numerical Simulation for the MHD Homogeneous Shear Turbulence with the Uniform Magnetic Field MASAYOSHI OKAMOTO, Department of the Mechanical Engineering, Shizuoka University — The MHD homogeneous shear turbulent flows with the streamwise or span uniform magnetic field are investigated by means of the direct numerical simulation. The kinetic and magnetic energy in the streamwise uniform magnetic field cases are slightly small in comparison with the zero mean magnetic field case. The energy transformation term between the kinetic and magnetic energy, which is related with only fluctuating-field quantities, is balanced with that of the mean magnetic field. Under the spanwise magnetic field, the kinetic and magnetic energy is strongly suppressed and the Reynolds and Maxwell stresses become isotropic. The negative production term of the kinetic energy plays an important role in the energy suppression. The contribution of the energy transformation term of the fluctuating field is small unlike the streamwise magnetic field cases. From the energy-spectral viewpoints, the additional spanwise magnetic field has an influence on the large-scale factors.

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