

Observation of Mode Resonance Structure in Synchrotron Magnet String, T. AOKI, K. NISHIKIGOORI, AEC; M. KUMADA, NIRS - Synchrotron magnet consist of a number of magnets and can be regarded as a ladder circuit of inductance, resistance and a capacitance or a transmission-line circuit. In particular, a stray capacitance to the ground is of importance and the unit circuit can be described by the three input and three output circuit. The relevant parameter in this circuit can be decomposed into two separate orthogonal mode of common and normal mode circuit where in most of other author's literature only the normal mode has been treated. Thyristor rectified power supply of most of a high power synchrotron is also known to generate spike noises of high frequency component. The combination of the spike and the resonant property of the ladder circuit can enhance a magnetic field distortion and may deteriorate a circulating beam property where the current distortion and the magnetic field distortion are not necessary to be identical. In this article, we report the frequency characteristics and the spatial distribution of the resonant structure of the normal and the common mode magnetic field along magnetic string under high power excitation of routine operation condition. The observation and the theory is compared.