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About Electromagnetic Compatibility of Track Circuits with the Traction Supply System of Railway

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Abstract:

Track circuits are of fundamental importance for the safety in railway systems. Thus, they must be immune from electromagnetic interference (EMI). To this aim they must be accurately characterized. The paper deals with the determination of spectrum composition of traction current with the electric traction. A method of measuring the parameters of track circuits (time and amplitude parameters of code current, flowing in rail lines, an input impedance of a track circuit, characteristic impedance and propagation constant) is considered Automated method of measurement of parameters of track circuits and harmonics of return traction current was elaborated by the car-laboratory. The harmonics coinciding with the code frequency are inadmissible for the track circuits.

Keywords: EMI measurement, harmonics, immunity, track circuit, electromotive force, railway system

I. Introduction

The code track circuits (TC) serve as basic detectors supervising situation with trains on railway sections. They provide information on occupancy of blocks-sections, integrity of rails, and also carry out functions of the channel of transferring codes of the automatic locomotive signaling system from track-devices to the locomotive. Thus, the track circuits are a primary element that directly determines the safety of train movement [1]–[4]. It is important to control all parameters, not only the code currents and track circuits. Significant number of failures in track circuits is caused by presence of harmonics and impulse influences of the return traction current (especially on the railways electrified by the alternating current) [9].

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