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Proofs of the undecidability of steganalysis techniques (Conference Paper)

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Abstract

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Steganalysis comprises a set of techniques that strive to find concealed information within diverse types of digital media. On the contrary, Steganography involves a group of methods that, by manipulation of a cover object, aims to hide information to make it imperceptible. Current Steganalysis techniques suffer from a certain degree of failure in the detection of a payload and, frequently, the impossibility to discover if a media hides some information. In this chapter, we prove that the detection of hidden material within a media, or a Steganalysis procedure, is an undecidable problem. Our proof comprises two sets of tests: first, we demonstrate the undecidability by the principle of Diagonalization of Cantor, and second, we applied a reduction technique based on the undecidability of malware detection. For this part, we outline the hypothesis that there exists a similitude between Steganography techniques and the generation of an innocuous computer virus. Both demonstrations proved that Steganalysis procedures are undecidable problems. © Springer Nature Switzerland AG 2020.

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