סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד' 29.12.21 (כה' בטבת, תשפ"ב), בשעה 13:30 הסמינר יתקיים באמצעות הזום:

https://technion.zoom.us/j/96430140896

מרצה: מתן לוין

מנחה: פרופ' איל זוסמן , ד"ר אורנה ברויאר

על הנושא:

Geometry and Material Optimization of Electromagnetic Radiation Absorbers using 3D Printing

The seminar will be given in English

תקציר ההרצאה :

Electromagnetic radiation generated by electrical devices is a common by-product that may interfere with other electrical equipment and cause harm to animals and humans. With the increasing popularity of electronic devices and wireless communications, this radiation pollution has gone up. Therefore, there is a growing need for electromagnetic interference (EMI) shielding materials. A common method of EMI shielding is the use of radiation absorbing materials (RAM). RAM can be challenging to integrate into radiation-emitting electronics while minimizing the weight and volume and maintaining a broad spectrum of absorption. Common RAMs are based on composites of carbon allotropes fillers in a thermoplastic matrix. Traditional manufacturing methods of these materials are inherently limited in geometry and morphology, thus hindering their full absorption potential.

This study aimed to design and manufacture devices that effectively absorb electromagnetic radiation in the X band (8-12 GHz). For this purpose, we selected Polyamide 12 as a matrix and studied three carbon-based fillers: Graphite, Carbon black, and Carbon nanotubes. These were compounded, extruded into filaments, and printed using FDM (fused filament modeling) into periodic geometries. The complex dielectric coefficients of the compounds were characterized using rectangular waveguides. The optimal geometry of the device was selected using finite element analysis to maximize the radiation absorption and minimize its reflection. In addition, a dynamic device with controllable amplitude and frequency of absorbed radiation at different polarizations was developed. The analyses were verified by comparison to reflectometry measurements of the printed models.

בברכה

פרופ"ח אתי סאס

מרכז הסמינרים