EXAMENSARBETARE SÖKES!

NOISE MAPPING OF A MAGNETIC RESONANCE IMAGING (MRI) SYSTEM

BACKGROUND

Magnetic Resonance Imaging (MRI) is a technique used in the field of radiology where a strong magnetic field, radio frequency (RF) waves and field gradients are employed to achieve images of the inside of the patients' body. A known issue when it comes to MRI examinations is the extremely high noise present caused by the gradient magnetic field. Rapid current switching within the coils produces enormous Lorentz forces acting on the coils which, in turn, emits noise. The acoustic noise varies depending on the choice of image parameters and the MRI sequence selection. Other noise sources associated with an MRI system are RF waves and noise produced by sub-systems like fans and cryogen systems used for cooling of the magnet.

The most common way for noise controlling an MRI device is passive noise control, where the patient is asked to wear earplugs and/or headphones. While examinations often last between 20-30 minutes, wearing headphones under such a long period of time in combination with other factors (such as the patient having to remain completely still during that time) may be extremely uncomfortable for the person in question.

AIM

The aim of this project will therefore be to reduce the noise produced by the MRI system as well as the one transmitted into other adjacent rooms. To that end, a pre-study will be first carried out in order to determine the overall noise level of the system and to establish a noise radiation map. To do so, baseline data must be collected and the sound field of the MRI system should then be determined. Challenges such that of measuring surrounded by a strong magnetic field as well as the eventual noise-reduction strategies to be taken, should be addressed.

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