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A Frequency Domain Sampling of k-Space in Images Using Physical and Computational Simulations CATHERINE SEUNG-WOO KIM, ANGEL JUNG, SOL-JI CHOI, Choice Research Group — An ideal low pass filter (LPF) frequency would be able to increase the resolution of the MRI image as well as decrease the Ringing Artifact. Through the use of physical and computational methods in analyzing human chest MRI images, Inverse Fourier Transformation (IFT) transforms every spatial frequency points to its corresponding points in the final image. Such transformation process, from a physical spatial frequency to image domain, requires an immense amount of time and computational operations in the simulation. This research uses selective k-space to find a new mechanism of an image formation. Originally, the box filter, N/2-13N/40:N/2+13N/40=1, is used during the Fourier Transformations. Also, the Gaussian filter, y= $\exp(-r^2/p^2)$, where r=h-L/2, h=[0,M], L=2*13*N/40, and the size of frequency matrix (M, N) = (360,550) is tested. The variable p, chosen from 20 to 120, is tested in creating the image of an object. This research strives to develop a better physical and computational algorithm that would not only enhance the quality of the final image but also decrease the amount of time taken to produce the image.

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