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Mathematical Modeling in Modern Ultrasonography

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The article describes the novel directions of research the different applications of ultrasonography using mathematical modeling that were introduced in Center of ultrasound diagnostics and interventional sonography of Clinical hospital "Feofania" and will be applied for research prospectively with purpose of making knowledge model and promoting model guided medicine. Gray-scale, Doppler and sonoelastography characteristics are modeled and calculated on the human tissues and on the own-designed phantoms for different purposes. In view of the above computational models of the human body could be used in conjunction with medical imaging techniques to assist in the preparation, simulation and control of medical interventions to investigate the sources of errors of Ultrasound -guided interventions. The phantom modeling is especially valuable for teaching ultrasound guided interventional procedures, including quite progressive, as regional anesthesia, where the exact derivation of tubular structures is the basis of the method. Also we propose the novel technique of use the Anaglyph Ultrasound images of to provide a stereoscopic three-dimensional effect for more fully presentation of visual information.