The Data Acquisition Method of The Sussex MK4 System

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Introduction of the Sussex MK4

* 3D breast cancer detection system using EIT
* Current drive and voltage measurement
* The excitation current: 1mA peak to peak
* The voltage meter: 14-bit ADCs with input range of 5V peak to peak
* Operation frequency: 10 kHz, 20 kHz, 50 kHz, 100 kHz, 200 kHz, 500 kHz, 1 MHz, 2 MHz, 5 MHz
The Sussex MK4

Fig.1 the Mk4 scanner, PXI, patient bed, saline and heating tank, and internal frame
Tank parameters

1) Diameter: 18 cm
2) Height: adjustable in vertical direction; Maximum: 5 cm
3) Maximum volume: 1250 ml corresponding to brassiere sizes 44C, 38E, 32G, 28H, etc.
4) Electrodes on the bottom, slightly recessed

Fig. 2 the tank and the planar electrode array
The process of examination

1) Fill the tank with body-temperature saline
2) Patient lies on the bed with a breast in the tank
3) Rise the electrode plane and press the breast into the chest to reduce the height of the breast
4) Data acquisition
1) the number of the electrodes: 85
2) the adjacent electrode distance: 17cm
3) electrodes are deployed in a hexagonal pattern

Fig. 3 The hexagonal pattern of the electrode array
Data acquisition method

1) small hexagonal measurement area scans the whole tank
2) three sample directions in each small hexagonal measurement
3) maximum 12 measurements in each excitation
4) 123 current excitations
5) 1416 voltage measurements

Fig. 4 the current excitations and voltage measurements in a hexagonal measurement area
Display of the Data acquisition method
Reason for the hexagonal data acquisition method

* 1) small dynamic range
* 2) good SNR

Fig. 6 the voltage measurements corresponding to Fig. 5

Fig. 5 the 12 measurements in the measurement area and the 14 measurements outside the measurement area
References

Thank you for your attention