ns_fid_calib package

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Description	The ns_fid_calib package computes a reference voltage based on several fid measurements using a range of RF voltages.
Platform	VB17, VE11C, VE11E, VE12U-SP01, VE12U-AP01, VE12U-AP02, VE12U-AP04
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1 Introduction

The ns_fid_calib package contains a modified fid sequence and a custom ICE reconstruction to acquire and assess reference voltage based on several fid measurements at different voltages. The signal is fitted to extract a reference voltage. This package is well suited for X-nuclei experiments for which there is no automatic voltage calibration.

2 Installation

2.1 Summary of files

The package contains a ns_fid_calib sequence ('ns' stands for NeuroSpin) and an associated ICE reconstruction program.

VE12U software

```
MedCom
└── MriCustomer
    ├── seq
    │   ├── ns_fid_calib.dll
    │   └── libns_fid_calib.so
    └── ice
        ├── IceProgramfidCalib.ipr
        ├── IcefidCalib.dll
        ├── IcefidCalib.evp
        └── libIcefidCalib.so
```

2.2 Installation procedure

Execute the file **install_neurospin_seq_Vxxx.bat** which copies the installation files to C:/MedCom according to the corresponding tree. For VE platform or higher, do not forget to switch to update mode by using the MrEmbeddedControlGui tool before executing the install script.

Figure 1: Custom parameters in "Sequence > Special" card.

3 ns_fid_calib sequence

3.1 Description

The ns_fid_calib sequence consists of a multiple fid measurements using an increasing RF voltage for each measurement.

3.2 Sequence parameters

Measurements parameter (in Contrast > Common card) is used to set the number of measurements used to cover a range of RF voltages.

Min./Max. corr. factor parameters (in Sequence > Special card) set the range of voltages used during the measurement loop. The initial reference voltage value must be set manually. Based on this initial reference voltage the RF pulse voltage will be scaled using the Min./Max. parameters using number of steps given by the Measurement parameter.

Averages parameter (in Routine card) can be used to average multiple measurements at each RF voltage step. This parameter can be particularly useful when signal from X-nucleus is very low.

3.3 Remarks

- In order to properly evaluate the reference voltage, TR parameter must be long enough to enable a full relaxation of the magnetization between each measurement.
- The proposed method is different from the standard calibration method used by Siemens. In this regards, it might lead to different a reference voltage.
- The calculated reference voltage is not loaded automatically. To use the resulting reference voltage, it must be loaded manually into the adjustment card.

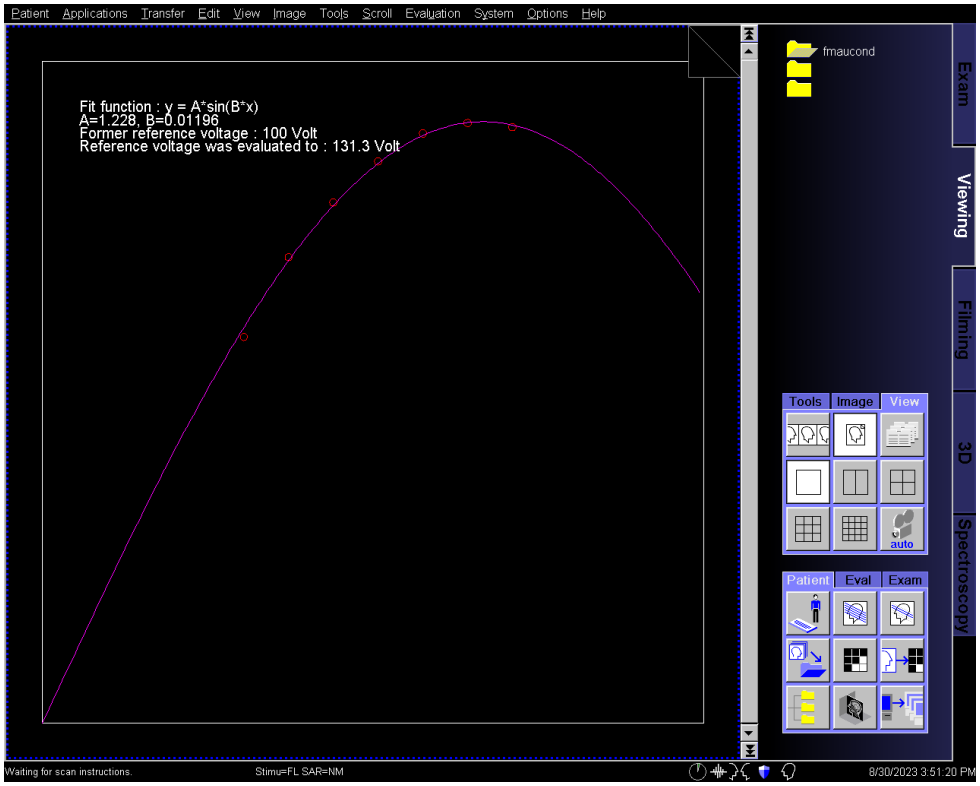

Figure 2: Resulting figure shown at the console. The red circles correspond to the fid signal obtained at different RF voltage amplitudes. The curve is obtain by fitting the measurements using the expected sine profile of the signal. The reference voltage is computed from the point where the maximum signal is reached in the fitted curve. In this example, the reference voltage is evaluated to 131.3 Volt.

4 ICE reconstruction

4.1 Available series

The ICE reconstruction will produce a graph showing the fid signal intensity for each RF voltage amplitude and the resulting fit curve. This graph is registered as a DICOM image available within an additional series.

It is also useful to open the inline view during acquisition as the graph will appear in the online window as well.

5 Additional information

5.1 Version & new features

v1.0

- Initial release

v1.1

- In case of multi-receive coils, the signal was not averaged over the channels. Now corrected.

5.2 Your feedback

Your feedback is welcome regarding the use of this package. In particular, we are interested in having feedbacks on the following topics:

- if you find out bugs
- if you have suggestions for improvements or additional features
- if you have any tips to share

Please contact the authors of this package.