

Data collection (01/11/16)

In Matlab you can read-in the file using something like:

```
temp = load('ST1trial3.DAT');
```

The first part of the first couple of lines is:

```
1 0.04375 0.02402 0.02289 0.02120 0.02043 0.01906 0.017711 0.02491 0.05062 0.03
2 0.04464 0.02441 0.02269 0.02133 0.02083 0.01931 0.017752 0.02507 0.05081 0.03
```

These are collected using a system with 8 equally-spaced electrodes. Each electrode occupies 1/64-th of the boundary, that is the gap between electrodes is 7 times the electrode width.

In the above matrix `temp`, the first column is the time with the remaining 49 numbers giving the measured voltage between a pair of electrodes. The 49 values are divided into 7 blocks, with 7 measurement in each block.

The internal potential field is created by passing current between two electrodes, and is then measured on the boundary by recording the voltage (potential difference) between a pair of electrodes. A reference electrode is part of both the drive and measurement circuits.

To start, drive a current between the reference electrode (Electrode 1) and Electrode 2, then in turn measure the voltages between Electrode 1 and Electrode 2, Electrode 1 and Electrode 3, ..., Electrode 1 and Electrode 8. Next, move to a drive circuit between Electrode 1 and Electrode 3, and measure the voltages between Electrode 1 and Electrode 2, Electrode 1 and Electrode 3, ..., Electrode 1 and Electrode 8. Continue, moving the second drive electrode around until at Electrode 8, and measure the voltages between Electrode 1 and Electrode 2, Electrode 1 and Electrode 3, ..., Electrode 1 and Electrode 8.

The Matlab command (is there a way without the transpose?)

```
reshape(temp(1,:),7,7)'
```

produces the matrix

ans =

0.0437	0.0240	0.0229	0.0212	0.0204	0.0191	0.0177
0.0249	0.0506	0.0311	0.0272	0.0250	0.0221	0.0196
0.0232	0.0308	0.0602	0.0332	0.0286	0.0250	0.0210
0.0211	0.0263	0.0332	0.0569	0.0329	0.0273	0.0218
0.0203	0.0241	0.0288	0.0332	0.0576	0.0314	0.0236
0.0191	0.0220	0.0248	0.0269	0.0313	0.0592	0.0260
0.0170	0.0181	0.0203	0.0211	0.0225	0.0258	0.0461

which has elements y_{ij} giving the voltage with Electrode i in the drive circuit and Electrode j in the measurement circuit – recalling that Electrode 1 is always part of both the drive and the measurement circuits.