Cohen and Maunsell data file format

_trialinfo.mat files

`trialinfo`
structure with behavioral and stimulus information. Fields as follows:

        `numtrials: 1247`
number of trials
        `instruct: [1247x1 double]`
1 if instruction trial, 0 if not (instruction trials have a single stimulus, used at the start of each block to tell the monkey which stimulus to attend to on the upcoming block; I usually don't analyze these)
        `valid: [1247x1 double]`
1 if the attention cue is valid (i.e. the attending stimulus is the one that changed)
        `catchtrial: [1247x1 double]`
1 for catch trials (no stimulus changes within the first 5 seconds; monkey is rewarded for fixating)
        `attendloc: [1247x1 double]`
0 for right, 1 for left (changes in blocks of 125 trials)
        `correctloc: [1247x1 double]`
0 when the stimulus on the right changes, 1 for the stimulus on the left (you could also calculate this using the information from `attendloc` and `valid`)
        `targstimnum: [1247x1 double]`
stimulus number on which the orientation change occurs
        `ochange: [1247x1 double]`
degrees of orientation change (new orientation is the base orientation + `ochange`)
        `eotcode: [1247x1 double]`
end of trial code (i.e. behavioral outcome), key as follows:
0 = correct (results in a reward for a correctly detected change or for fixating on catch trials)
1 = missed (a change happened and the monkey missed it)
2 = early valid (false alarm to the attended stimulus)
3 = early invalid (false alarm to the unattended stimulus)
4 = broke (monkey made a saccade to a location other than the two stimuli)
5 = ignored (the monkey never attained fixation)

The next few fields are global times in ms that I use for alignment. The analogous times with a new start time for each trial are in the `trialtimes` structure below. You should just use these if you want to look at something with a timescale longer than a trial.
        `trialstart: [1247x1 double]`
time that the trial started in ms (just used for alignment)
        `fixon: [1247x1 double]`
time the fixation point appears
        `fixate: [1247x1 double]`
time the monkey attained fixation
        `numstim: [1247x1 double]`

number of stimulus pairs that appeared
```
          stimon: {1247x1 cell}
```
time that each stimulus pair came on (the two stimuli were always flashed synchronously)
```
          stimoff: {1247x1 cell}
```
time that the stimuli turned off (should be `stimon`+200 ms except for the target)
```
        targontime: [1247x1 double]
```
time that the target (changed stimulus) turned on
```
          saccade: [1247x1 double]
```
time the saccade was initiated
```
                rt: [1247x1 double]
```
reaction time (saccade-targontime)
```
        timetotarg: [1247x1 double]
```
total time until the orientation changed
```
          gabor0: [1x1 struct]
```
information about the base Gabor on the right. The fields should be self explanatory except the most important one: the orientation, which is `gabor0.directionDeg`
```
          gabor1: [1x1 struct]
```
same, for the left Gabor

_timesbytrialnex.mat files

```
trialtimes
```

This is a `numtrials x 1` struct array
The following fields have times in ms with a new 0 for the start of each trial. They are analogous to the fields above.
```
     fixon
     fixate
     stimon
     stimoff
     saccade
     targon
```

```
     sutimes
```
This is a numunits x 1 cell array of spike times for each neuron (single + multiunit) on each trial. Time 0 is the start of the trial (same as the other fields)

```
arrayid =
     <130x1 double>
```
   numunits x 1 array of array identity. 1 if the neuron is in the right hemisphere (left receptive field), 2 if the neuron is in the left hemisphere.

_ratesnex.mat files

`rates`

This is a `numtrials x 1` struct array
The following fields (`fieldname.su`) have spike counts for each unit for each trial. In all cases, spike counts are computed from 60 ms after the event happened (e.g. the stimulus turned on) to 60 ms after it ended (to account for the latency of neuronal responses in V4).

    `fixate`
period between when monkey attained fixation and when the first stimulus turned on
    `stim`
cell array of spike counts during all stimulus presentation
    `prev`
stimulus before the target (this is what most of my analyses are based on)
    `targ`
changed stimulus
    `preprev`
two stimuli before the change
    `first`
first stimulus (doesn't show adaptation)

Other things in the ratesnex files:
The matrices `prevsu`, `targsu`, etc. are redundant with `rates` - they are just `numunits x numtrials` matrices of rates during each period (I found those to be a helpful shortcut for many analyses).
`arrayid` is a `numelectrodes x 2` matrix. The first column is just the electrode number, and the second represents whether the electrode was in the left array (1) or the right array (2, I think…)
`suarrayid` is a `numunits x 1` vector of array ids with the same conventions
`unitid` is a `numunits x 1` vector of electrode ids (e.g. `unitid(2)=3`, meaning that neuron #2 was on electrode #3)