

Purpose:

Tracker.m is a function that assigns particle identifications in 2 frames based on a 'diffusion tracker' (minimizing squared displacements) or a 'strain tracker' (minimizing stored/dissipated energy).

Making sure *Tracker.m* is fast

Please note that the performance of the function is improved tremendously by compiling *assignmentoptimal.c* which is included in the main folder. To compile, run:

```
>> mex assignmentoptimal.c
```

You can check that MATLAB is running the compiled version by running:

```
>> which assignmentoptimal
```

and checking that the result is a compiled file and not a .m file.

What you need for *Tracker.m* to work

You will need the following functions in your folder:

- (1) *Tracker.m*
- (2) *assignmentoptimal.m*
- (3) *assignmentoptimal.c*

Tracker.m is included in the main folder. Although both *assignmentoptimal.m* and *assignmentoptimal.c* are also in the main folder, they can be found here: <http://www.mathworks.com/matlabcentral/fileexchange/6543>

Finding Examples

Examples of how to use *Tracker.m* can be found in the Example folder. The folder contains the following:

- (1) *Example.m* – a script that allows one to test *Tracker.m* on examples of simulated and real data of diffusion and material deformation.
- (2) *xyt_diff.mat* – an array of particle positions at two time points corresponding a simulation of diffusion.
- (3) *xyt_trans.mat* – an array of particle positions at two time points corresponding a simulation of translation.
- (4) *xyt_stretch.mat* – an array of particle positions at two time points corresponding a simulation of pure stretch.
- (5) *xyt_shear.mat* – an array of particle positions at two time points corresponding a simulation of shear.

- (6) *xyt_tfm.mat* – an array of particle positions at two time points corresponding to substrate deformations due to cell traction forces, as used in traction force microscopy (TFM).
- (7) *trck2dsp.m* – a function that reformats the output of *Tracker.m* into a more convenient structure.

The example can be run immediately (after compiling *assignmentoptimal.c* to improve speed). The data type can be changed by the user in line 95 and the parameters used in *Tracker.m* can be modified in the lines following it.