Dear user,

please read the following basic information carefully:

The functions (described below) can be used to compute the firing rate of an aEIF neuron [as described in: *Hertäg, Loreen, Daniel Durstewitz, and Nicolas Brunel. "Analytical approximations of the firing rate of an adaptive exponential integrate-and-fire neuron in the presence of synaptic noise." Frontiers in computational neuroscience 8 (2014)*] in the white and colored noise scenario.

Since all programs were implemented for our special scientific purposes, they might not be eminently suitable for your wishes. Feel free to change the programs according to your needs. In preperation for release, we deleted some program lines to make it more user-friendly. If we thereby removed accidently too much and incorporated errors, please report the bug(s) to *loreen.hertaeg@zi-mannheim.de*. Thanks for your help and understanding.

List of functions (see more details in the Matlab-code):

- **CompPV_EIF_Distw**: This program computes the P(V)-distributon for the w-Dist.-approach.
- **CompPV_EIFw**: This program computes the P(V)-distributon for the <w>-approach.
- **CompVarISI_EIF**: This program computes the variance of the ISI-distribution of an EIF neuron (for AdEx neuron: a=0 and w=b*tcw*f; average approach)
- **FR_AdEx_2DFPeq_LCTL**: This function computes the firing rate derived from the zeroth and second order contribution to the solution of the Fokker-Planck equation in the long correlation time limit. If you do not want to use parallel computing, please comment the line "matlabpool(8)", "matlabpool('close')", and replace "parfor" with "for".
- **Fr_AdExCN_SC**: This program computes the approximated firing rate (self-consistently) of an AdEx neuron (with parameter a=0) in the colored noise case
- **Fr_AdExDist_SC**: This program computes the approximated firing rate (self-consistently) of an AdEx neuron (with parameter a=0) by means of the distribution approach
- **names**: assigns meaningful names to the components of the parameter vector.
- **R2Corr_EIF_Units:** This program computes the approximated 2nd order firing rate correction of an AdEx neuron (with parameter a=0) in colored noise case.

Data set:

- All white noise currents were created by: Isyn= <I> + std(I) * randn(1,N);
- The data sets used for this study were described and generated in/for:

  Hertäg, Loreen, et al. "An approximation to the adaptive exponential integrate-and-fire neuron model allows fast and predictive fitting to physiological data." Frontiers in computational neuroscience 6 (2012).

- **IndicesWT_CellTypesLayers.mat:** contains all indices needed to distinguish different cell types
- **NeuronParameter_all.mat:** contains all parameters used for the study
- For example, if you want to use L3 pyramidal cells:

  ```
  idx=ind_PC_L3;

  for cn:1:length(idx)
        C=NPar.C{idx(cn)};
  ```

```
gL=NPar.gL{idx(cn)};
EL=NPar.EL{idx(cn)};
sf=NPar.sf{idx(cn)};
Vup=NPar.Vup{idx(cn)};
tcw=NPar.tcw{idx(cn)};
b=NPar.b{idx(cn)};
Vth=NPar.Vth{idx(cn)};
Vr=NPar.Vr{idx(cn)};

        ...

end
```

If you need more information and/or explanations, please do not hesitate to contact us.