Dear Wei Hue, Sam, Linda, Jesus-Fernandez, Stephen,

I am starting to work on the BEST method such that the model is ready before Fou and Rafael arrives. But before I start I needed to clarify how the BEST methods fits with the other modules in the SoilMoisture space.

I am combining the different papers and software into one **SoilMoistureToolbox**. The reason for combining is that the different tools share common modules. This will facilitate further development of the Toolbox. Such that improving one module will benefits others. This is made possible due to my advanced knowledge in Julia language.

**MODULE: HYDAULIC\_PARAM:**

Derive a unique set of hydraulic parameters of any model (e.g. *Brooks and Corey, van Genuchten, Kosugi*) from θ(Ψ) and/ or K(θ) data.

Fit a *unimodal* or a *bimodal* model.

Options:

* Compute θs from bulk density OR optimize θs
* Compute θr from PSD by using MODULE Psd or by optimizing θr

If K(θ) data is not available

* Compute Ks from θ(Ψ) by using the MODULE KS
* Determine an algorithm to derive a unique set of hydraulic parameters. Different sets of hydraulic parameters could produce similar θ(Ψ) (Pollacco et al., 2008). We will develop an algorithm to select a unique feasible parameter sets.

**MODULE: PSD**

* From PSD data compute θr (Pollacco et al., 2019).
* From PSD data compute θ(Ψ)psd (Pollacco et al., 2019).
* Derive the hydraulic parameters from (Ψ)psd of the selected model (e.g. *Brooks and Corey, van Genuchten, Kosugi*) by using MODULE HYDAULIC\_PARAM.

**MODULE: KS**

Compute Ks from θ(Ψ) (Pollacco et al., 2017, 2013)

**MODULE: INFILTRATION**

**Input:** *time series of* *infiltration*, *initial soil moisture* and *total porosity*.

**Output:** derive the hydraulic parameters, and infiltration curves for any initial soil moisture.

* When no Psd is available than relationship between Kosugi parameters σ and Ψm is assumed (Fernández-Gálvez et al., 2019);
* With Psd data available than we will combine MODULE: PSD & MODULE INFILTRATION. The methodology needs to be developed.

**MODULE: PHYSICALLY BASED MODEL AND SCALLING**

The multiple layered hydraulic parameters will be scaled to for e.g. 2 layers by using the physically based hydrological model, HyPix, which is currently been developed.

The physically based model will enable to derive more accurately parameters of for e.g. bucket model.

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