The FOCuS codebase nightmare

Romano, Gaetano <g.romano@lancaster.ac.uk>
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Cc:Grose, Daniel <dan.grose@lancaster.ac.uk>
Hi Dan,

So I thought it was a good idea to give directly the repo under the table.
If there's the repo link, it means that the code was written and on github. I have referenced all the scripts where the code was made.
Recall that the color coding shows the line-by-line equivalents. All links point directly to the file where the main "update" function is defined, e.g. the one that does the focus iteration.

	Algorithm	Pure R	Pure Python	C++ (w\ Rcpp interface)
Romano & al. (2023) ([jmlr](#)) - **on github**	FOCuS (inters) w\ grid approx	[gtromano/FOCuS-R-prototype](#)		[gtromano/FOCuS](#)
	FOCuS (Melk)	[gtromano/exfocus](#)	[gtromano/exfocus-python](#)	[gtromano/FOCuS](#)
	R-FOCuS (inters) w\ grid approx	[gtromano/FOCuS-R-prototype](#)		[gtromano/FOCuS](#)
Ward & al. (2023) (arXiv)	Ex-FOCuS (Melk)	[gtromano/exfocus](#)	[gtromano/exfocus-python](#)	[gtromano/focus.new](#)
Romano & al. (2023) (arXiv)	NP-FOCuS (Melk)	[gtromano/NPFOCuS_Rprototype](#)	TBC	[gtromano/focus.new](#)

I am really really sorry but the original codebase is a mess. I started working on FOCuS on the summer of my PhD, hence the 50 different versions. You should have therefore received 6000 GitHub invitations.

History of the versions:

1. The yellow is the original codebase that went into the development of the original focus paper
   a. First written in R as a prototype
   b. translated directly into c++
2. The red is a version I had to write in c++ to speed up the original focus, as people were using the package and it wasn't fast
3. The light blue is the last iteration of focus, coming after exfocus. I have written it
   a. First in R, then
   b. Translated into c++
   c. Translated then into Python (This is the latest and greatest)

The last version I wrote, that should be the generalised one, color coded in light blue, is in focus.new (c++) and exfocus-python (pure python). **You might want to start looking there, the python version, maybe focusing on the gaussian case.**

As for NP-FOCuS, unironically the cleanest version I have it's in c++, under focus.new. I will clean the python version and upload it to exfocus-python. You'll note this is just a wrapper around exfocus, as mentioned.

Best,
Gaetano

Gaetano Romano
Mathematics and Statistics,
Lancaster University