Toy ECCO: AD Tool Intercomparisons
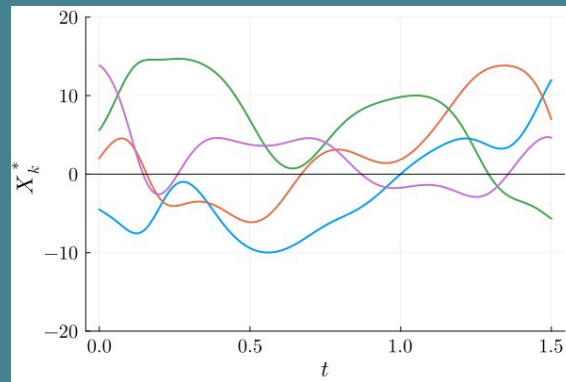
Shreyas Gaikwad, Max Trostel, Ellen Davenport, Gaël Forget

Get back to work!

	EXF bulk formulae	Mountain Glacier	L96
JAX		X	X
PyTorch		X	X
Enzyme	X		X
Tapenade		X	
Julia	X	X	X
Python		X	X
Fortran	X	X	
Optimization	X		X

- 3 languages (Python, Julia, Fortran)
- 4 AD tools (Enzyme, PyTorch, JAX, Tapenade)
- 3 Algorithms (bulk formulae, L96, mountain glacier)
- 16 toy problem experiments!!!!!

	EXF bulk formulae	Mountain Glacier	L96	With compile -> pre-compiled
JAX		4000s	17s	Time to run forward + adjoint
PyTorch		790s	0.60s	
Enzyme	X		27s -> 0.0025s	
Tapenade		0.52s		
Julia	X	7.7s	0.15s -> 0.000056s	Time to run foward
Python		1.5s	0.22s	
Fortran	X	0.14s		
Optimization	X		X	