

# Emulated reduced precision

- Replace standard precision declaration with our derived types.
- Emulates arbitrary precision without large language/hardware changes (e.g. CUDA/FPGAs).
- Increases run-time, only useful for investigation.

*Standard Fortran:*

REAL :: a,b,c

a = 1.442221

b = 2.136601

c = a+b

→ c=3.578822

*Reduced precision declarations:*

TYPE(reduced\_precision) :: a,b,c

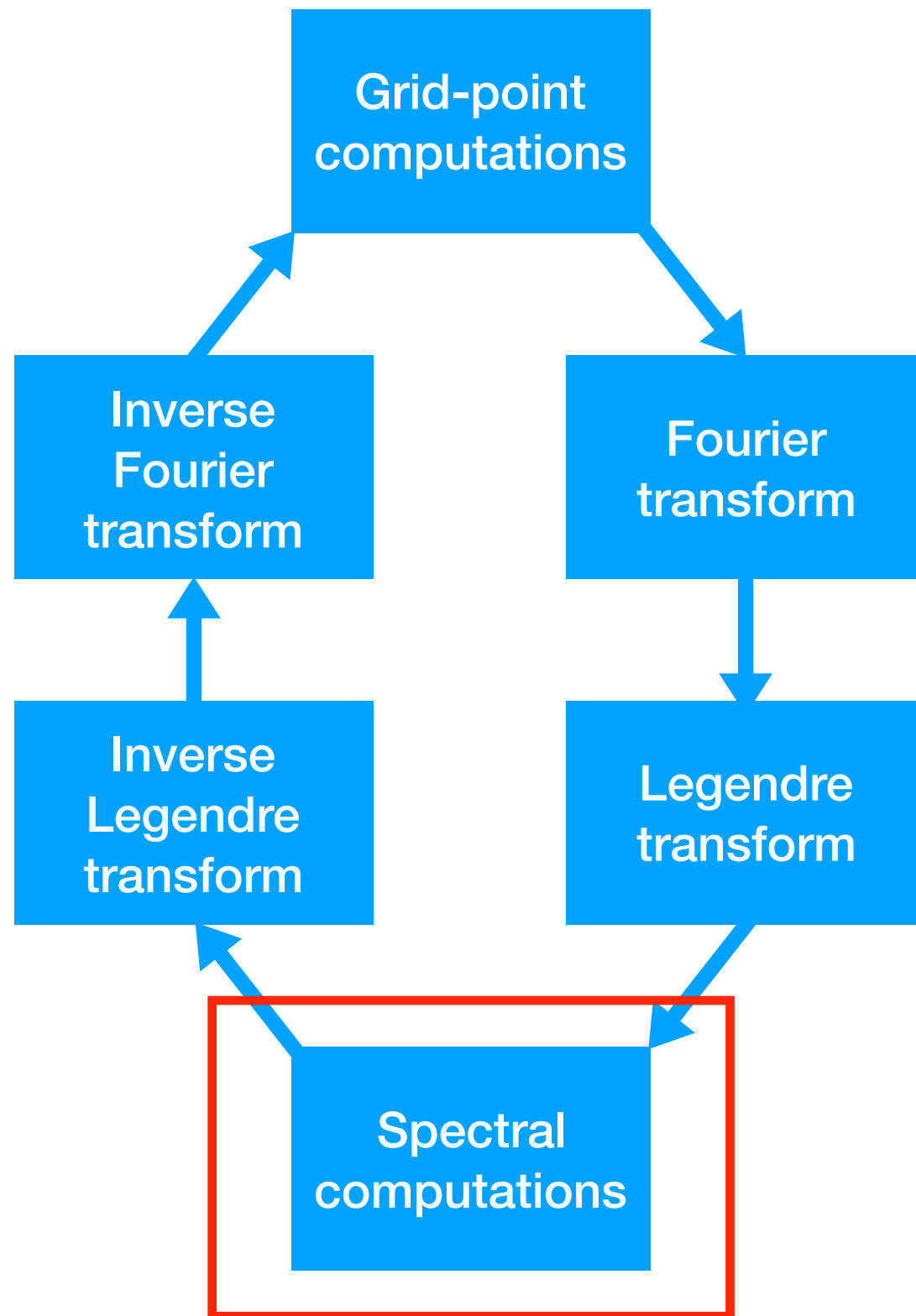
a = 1.442221

b = 2.136601

c = a+b

→ c=3.562500

## Spectral dynamical core schematic



What we've done

- Reduced precision calculations in spectral-space only.
- Spectral transforms and grid-point calculations in double precision.

Will ...

- introduce rounding errors to prognostic variables: vorticity, temperature etc.

Won't ...

- cover all algorithmic error propagation