3. GRID-BASED NUMERICAL METHODS FOR *COUPLED* PDE SOLVING

- Start with something like: $\partial_t^2(u) = c^2\partial_x^2(u) + g(w)\partial_x(u)$
  $\partial_t^2(w) = c\partial_x^2(w)$
  - Re-formulate to coupled, first-order in time system…. $u \to u, v; w \to w, h \ldots$
- Use a uniform grid to define $u, v, w, h \to u_i, v_i, w_i, h_i$
- Use finite difference (or finite volume) derivative formula for the spatial derivatives to define $\mathbf{RHS}_u, \mathbf{RHS}_v, \mathbf{RHS}_w, \mathbf{RHS}_h$
- Discretize all grid-variables in time and evolve coupled system via the same ODE method (eg. RK4)…. *(or do an even more complicated variant of this)*
- Apply *all* the boundary *conditions* to *all* the boundary grid points (may need more than one)

4. GRID-BASED NUMERICAL METHODS … IN A PARALLEL DISTRIBUTED COMPUTING ENVIRONMENT