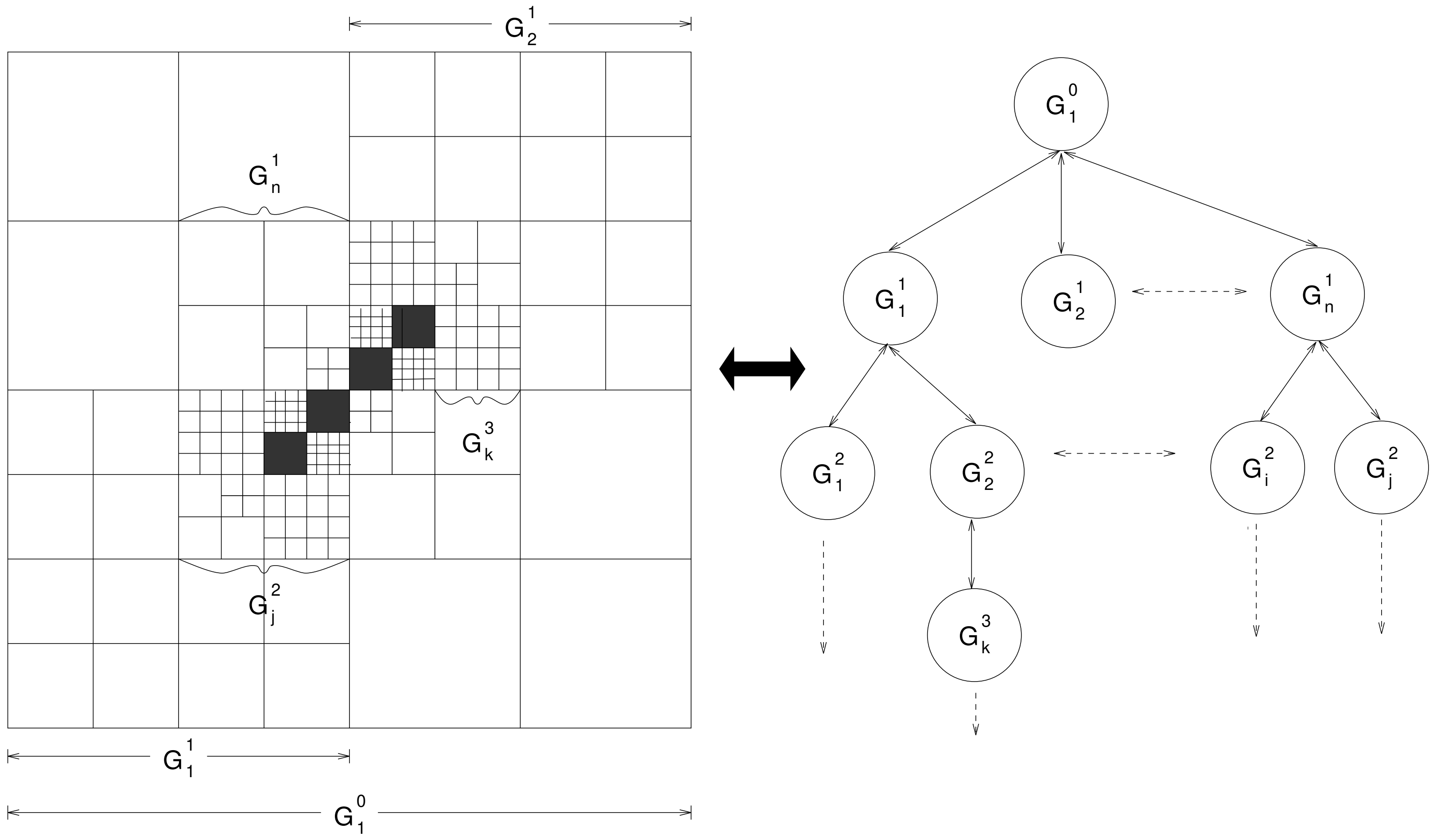
ADAPTIVE FINITE DIFFERENCE METHOD (AFDM)

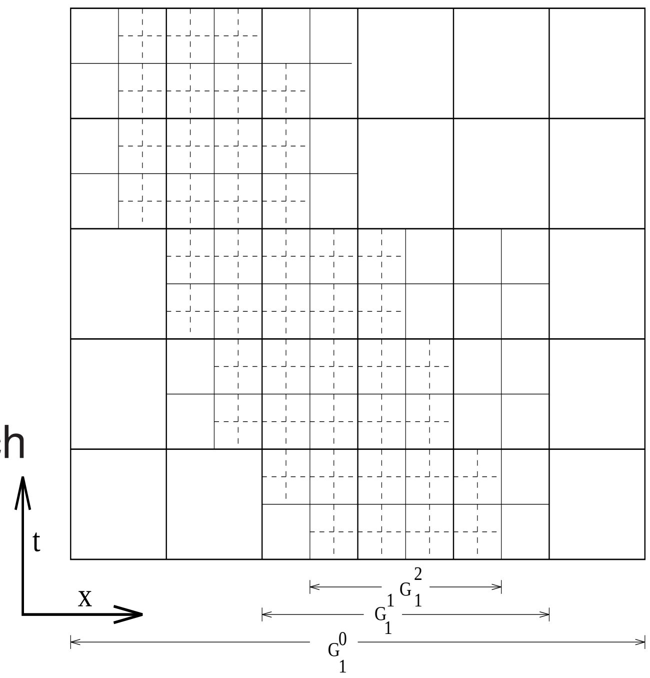
Grid Structure



Grid Structure

- Family of overlaying grids G_n^l
  ⇒ recursive space-time refinement
  ⇒ locally uniform component grids
  ⇒ grid nesting along the hierarchy

- Independent grid components
  ⇒ different difference equations on each level and grid



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Integration Algorithm Component

- Time Integration
  $\Rightarrow$ finite difference operator on each grid
  $\Rightarrow$ order of integration along hierarchy

- Error Estimation & Regriding
  $\Rightarrow$ flag region needing refinement
  $\Rightarrow$ cluster flagged points
  $\Rightarrow$ generate refined grid(s)
  $\Rightarrow$ maintain grid nesting

- Inter-grid Operations
  $\Rightarrow$ initialization of refined grids (Prolongation)
  $\Rightarrow$ update of coarse grids (Restriction)