

## GeneralisedElement

Virtual base class for all oomph-lib elements.  
The minimum requirement is that GeneralisedElements compute their contributions to the global residual vector and the global Jacobian matrix. GeneralisedElements do not necessarily have nodes.

## FiniteElement

Virtual base class for all finite elements. This class adds storage for nodes, and pure virtual interfaces for shape functions, etc to the GeneralisedElement base class.

## QElement

An example of a geometric element class: Implements the shape functions and the element's representation of its geometry — the mapping between its local and global coordinates, based on interpolation between its nodal coordinates.

## AdvectionDiffusionEquations

Implements the computation of the element's residual vector and Jacobian matrix, based on the weak form of the advection diffusion equation. This class contains the "abstract" mathematics — everything is expressed in terms of (pure virtual) basis and test functions.

## QAdvectionDiffusionElement

- Fully functional, advection diffusion element.
- Combines (by inheritance) the representation of the element geometry (from the QElement) with the computation of the element's residual vector and Jacobian matrix (from the AdvectionDiffusionEquations).
- Implements the basis and test functions (defined as pure virtual functions in the AdvectionDiffusionEquations class) by defining them as the QElement's geometric shape function — this corresponds to an iso-parametric Galerkin discretisation since the (same) functions are used:
  - as basis functions for the representation of the element geometry
  - as basis functions for the representation of the unknown function
  - as the test functions in the weak form of the equations.

### KEY:



Generic objects.



Equation-specific objects.  
If you formulate your own elements, you will have to implement these for your specific system of equations.