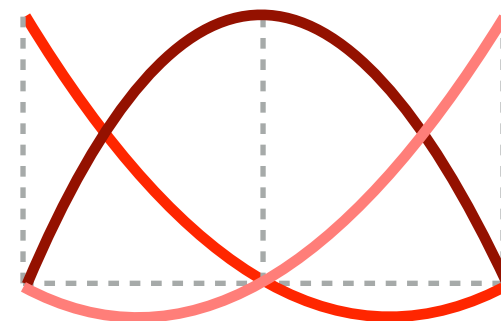


$$\begin{aligned}
A_{ij} &= \int_{\Omega} \nabla \phi_i(x) \cdot \nabla \phi_j(x) = \\
&= \sum_K \int_K \nabla \phi_i(x) \cdot \nabla \phi_j(x) = \\
&= \sum_K \int_K J_K^{-1} \hat{\nabla} \hat{\phi}_i(x) \cdot J_K^{-1} \hat{\nabla} \hat{\phi}_j(x) |\det J_K(x)| \\
&= \sum_K \sum_q J_K^{-1} \hat{\nabla} \hat{\phi}_i(x_q) \cdot J_K^{-1} \hat{\nabla} \hat{\phi}_j(x_q) |\det J_K(x_q)| w_q
\end{aligned}$$



xi

h

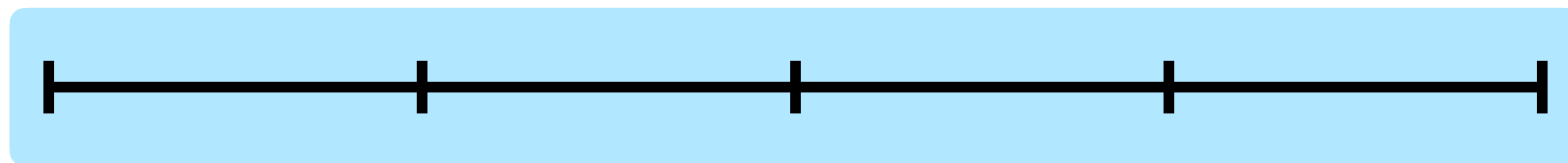
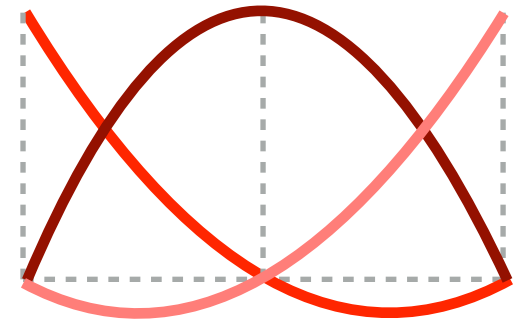
Triangulation

FiniteElement

Quadrature

Mapping

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A_{ij} &= \int_{\Omega} \nabla \phi_i(x) \cdot \nabla \phi_j(x) = \\
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\end{aligned}$$



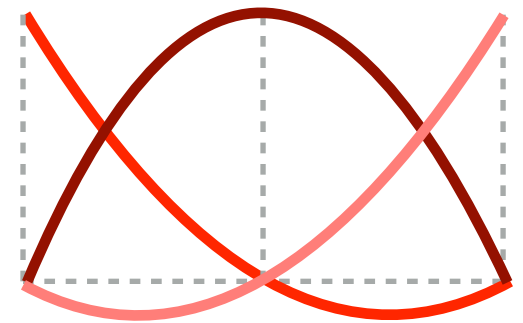
Triangulation

FiniteElement

Quadrature

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&= \sum_K \sum_q \boxed{J_K^{-1} \hat{\nabla} \hat{\phi}_i(x_q)} \cdot \boxed{J_K^{-1} \hat{\nabla} \hat{\phi}_j(x_q)} \boxed{|\det J_K(x_q)| w_q}
\end{aligned}$$



ξ

h

Triangulation

FiniteElement

Quadrature

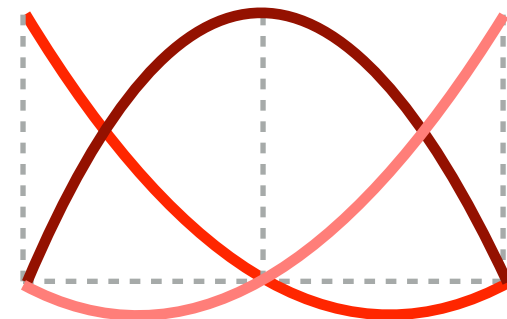
Mapping

$$A_{ij} = \int_{\Omega} \nabla \phi_i(x) \cdot \nabla \phi_j(x) =$$

$$= \sum_K \int_K \nabla \phi_i(x) \cdot \nabla \phi_j(x) =$$

$$= \sum_K \int_K J_K^{-1} \hat{\nabla} \hat{\phi}_i(x) \cdot J_K^{-1} \hat{\nabla} \hat{\phi}_j(x) |\det J_K(x)|$$

$$= \sum_K \sum_q J_K^{-1} \hat{\nabla} \hat{\phi}_i(x_q) \cdot J_K^{-1} \hat{\nabla} \hat{\phi}_j(x_q) |\det J_K(x_q)| w_q$$



ξ

h

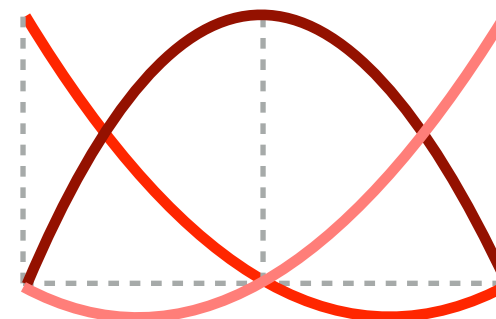
Triangulation

FiniteElement

Quadrature

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\end{aligned}$$

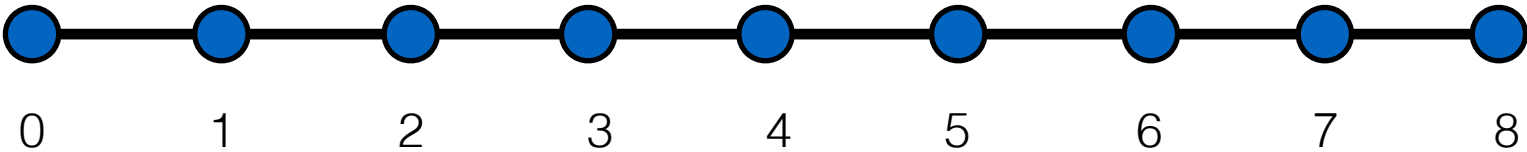
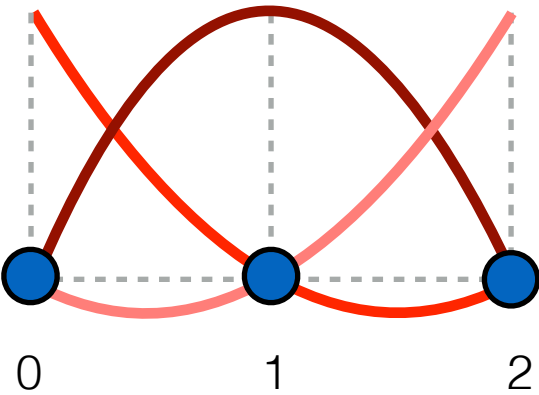


Triangulation FiniteElement Quadrature Mapping

DofHandler

FEValues

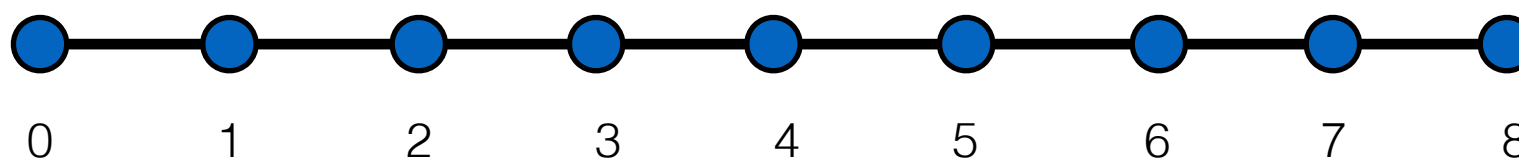
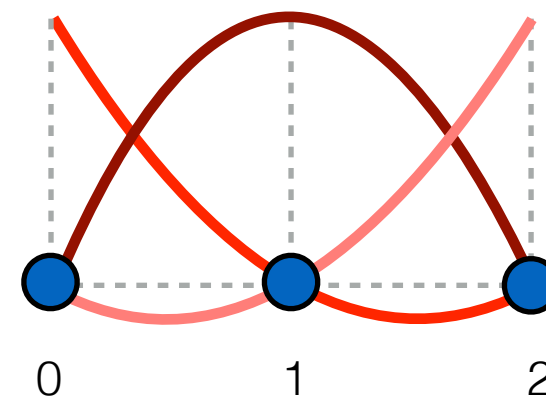
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Triangulation
FiniteElement
Quadrature
Mapping

DofHandler
FEValues

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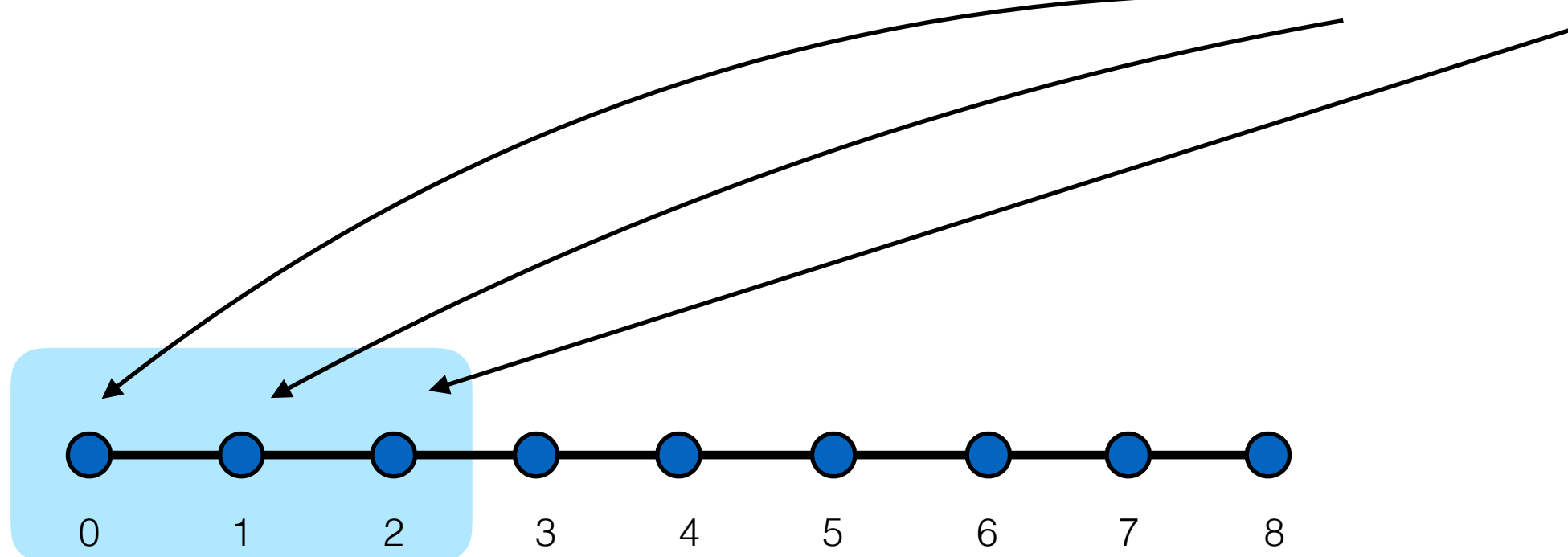
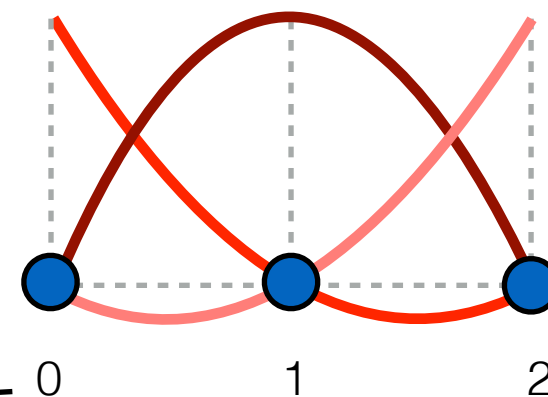
Triangulation FiniteElement Quadrature Mapping



DofHandler

FEValues

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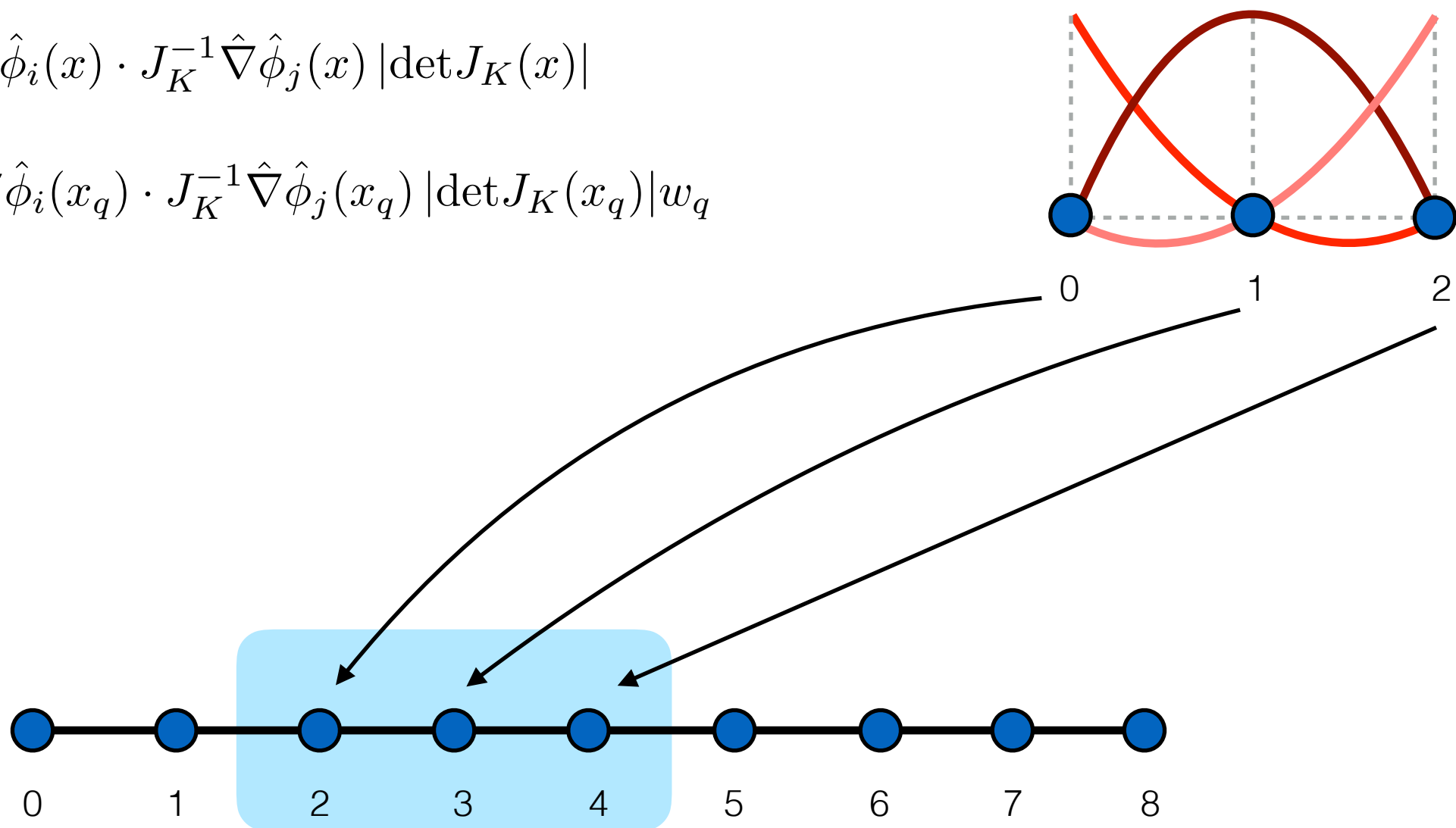


Triangulation FiniteElement Quadrature Mapping

DofHandler

FEValues

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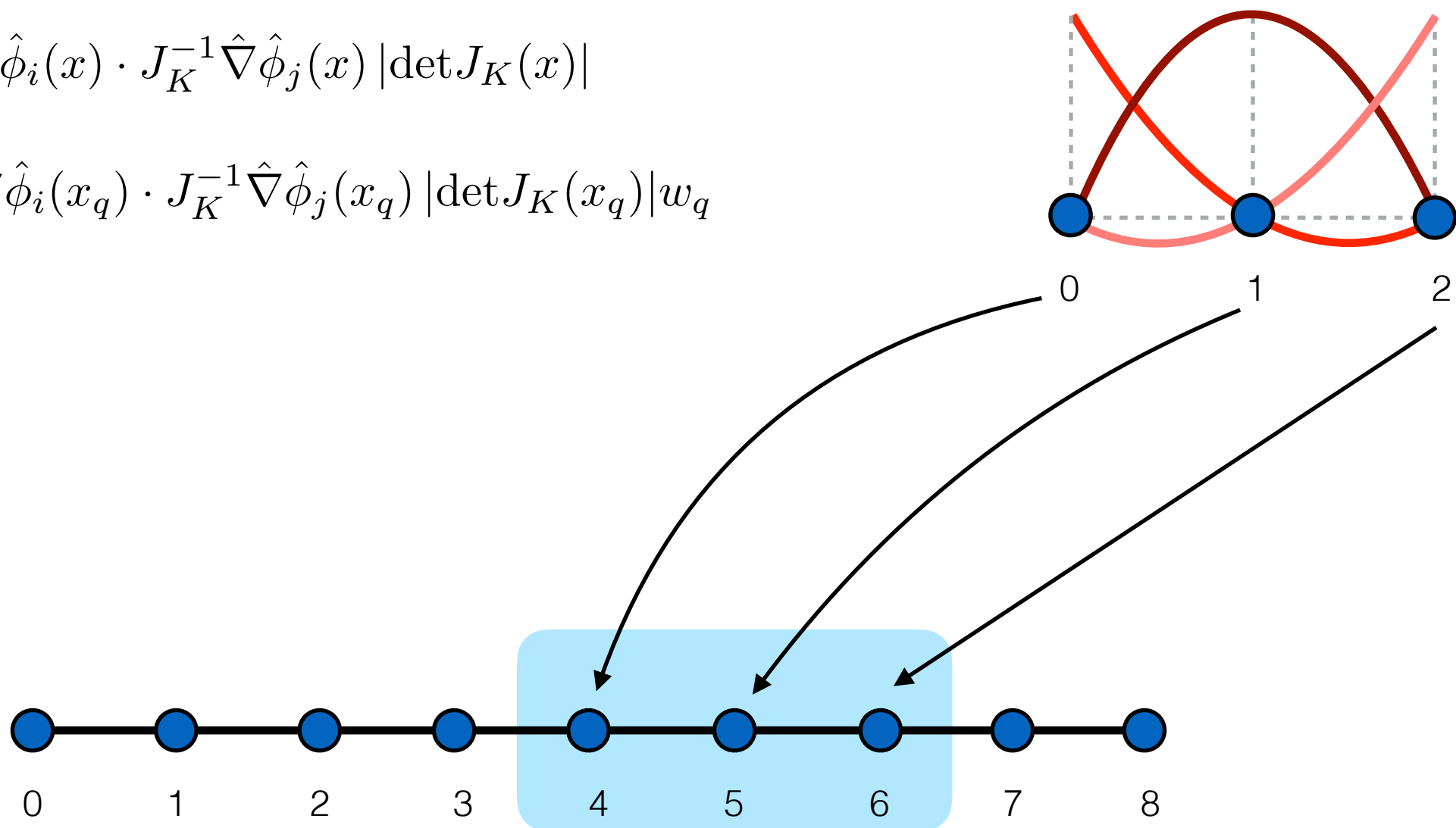


Triangulation FiniteElement Quadrature Mapping

DofHandler

FEValues

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\end{aligned}$$

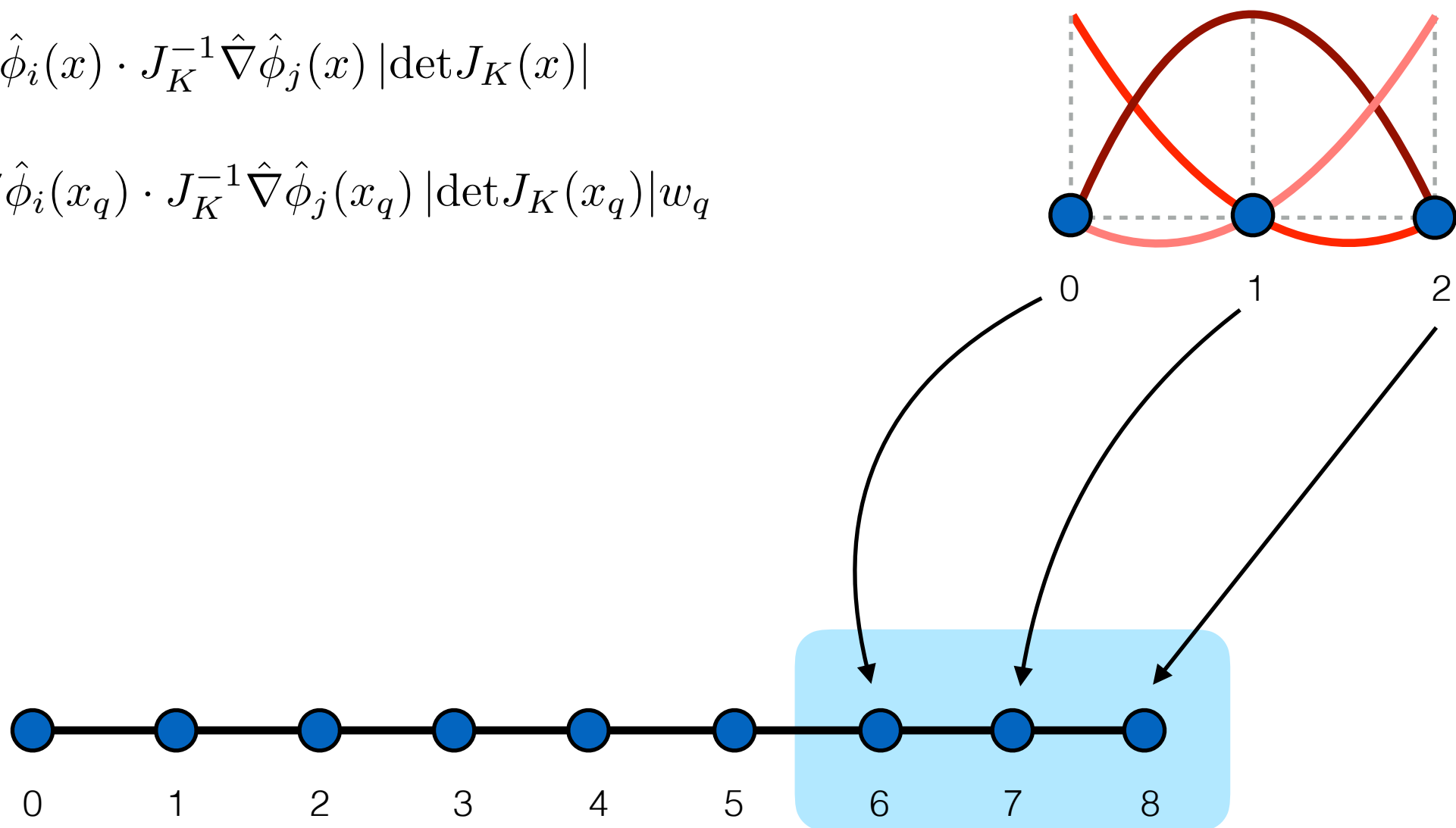


Triangulation FiniteElement Quadrature Mapping

DofHandler

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