

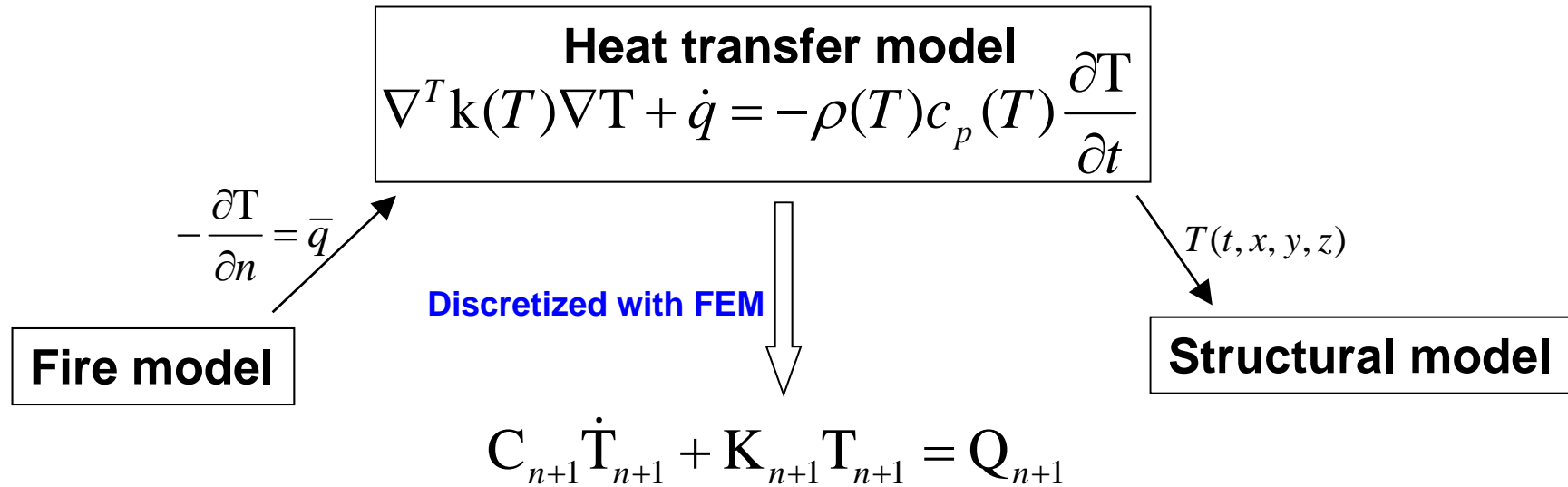


Developing A Heat Transfer Model In OpenSees For Structures In Fire

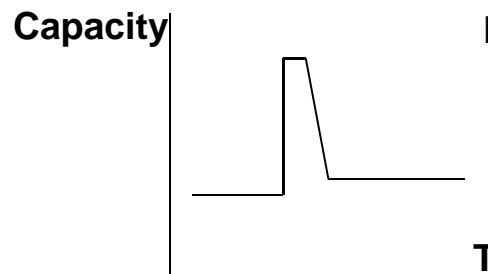
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The University of Edinburgh, School of Engineering

BRE Centre for Fire Safety Engineering

Theoretical Basis



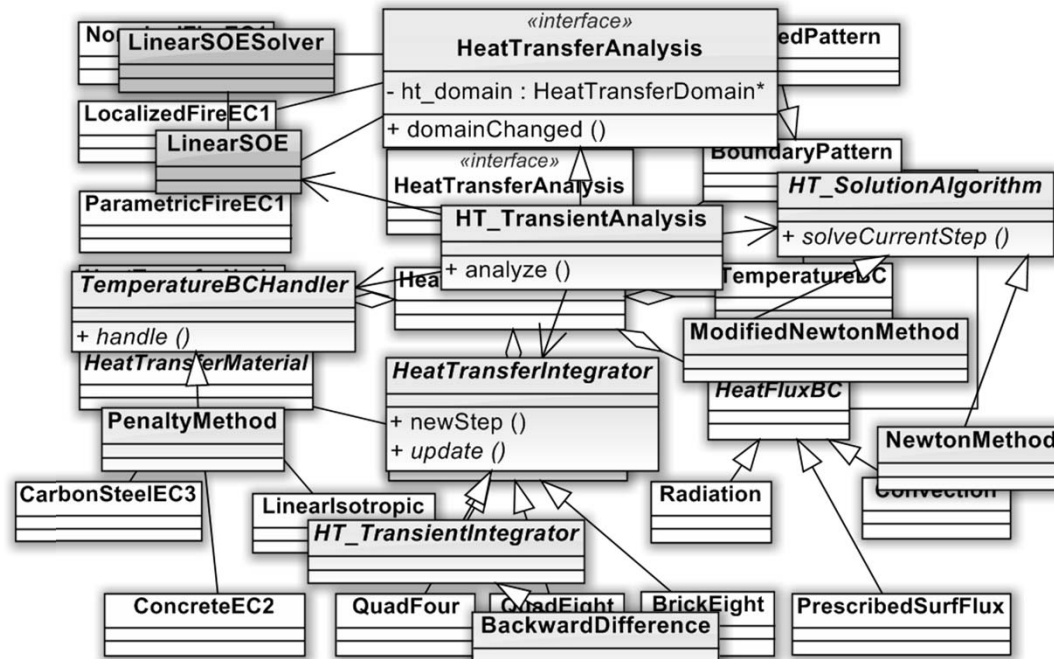
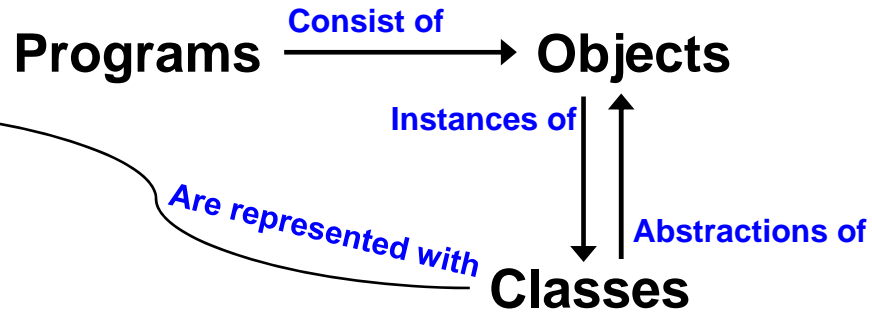
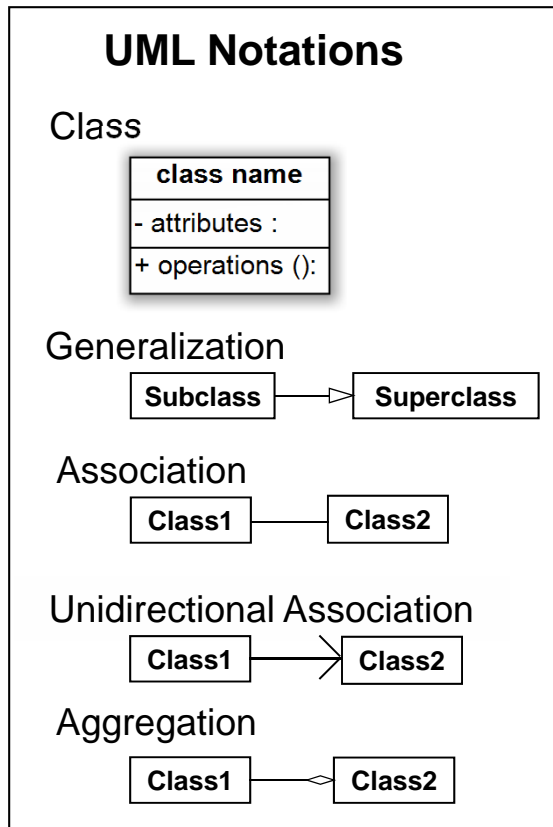
Treatment for phase change effects:



Enthalpy method (Morgan & Lemmon) :

$$C = \left(\frac{\nabla^T H \nabla H}{\nabla^T T \nabla T} \right)^{1/2}$$

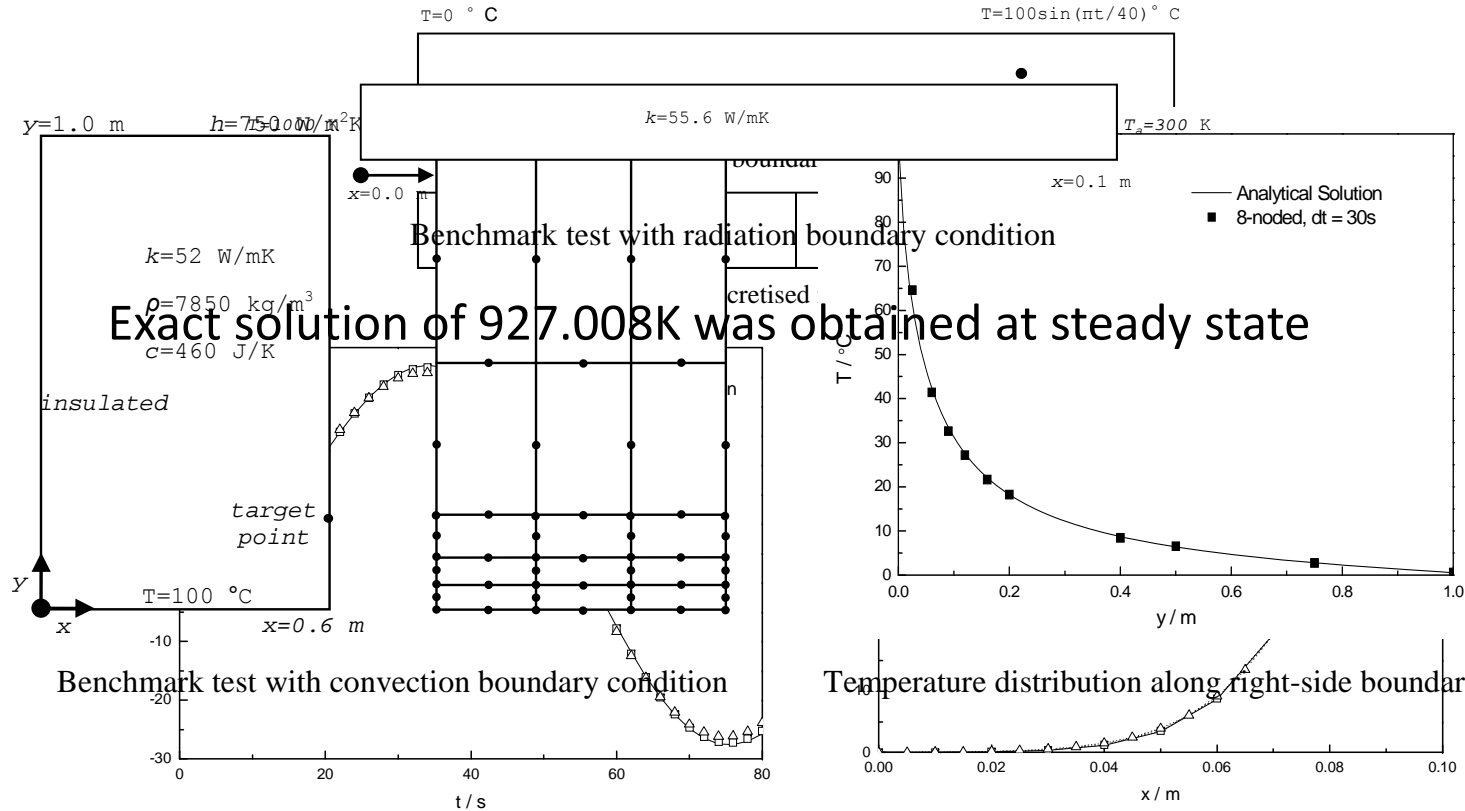
Object-oriented software design



Class diagram for heat transfer module
Heat transfer analysis classes

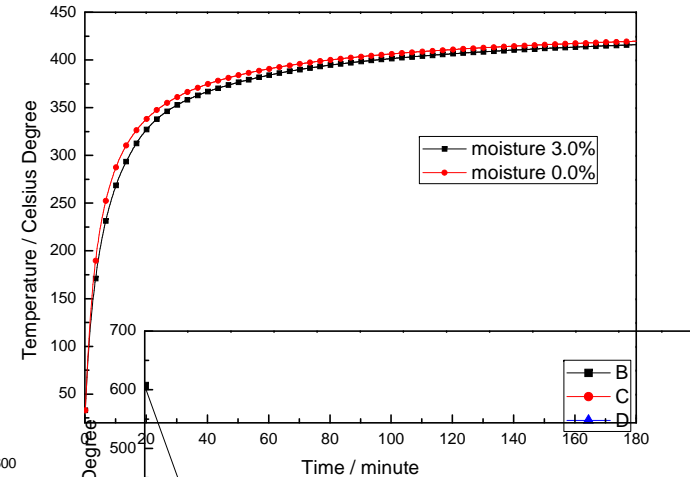
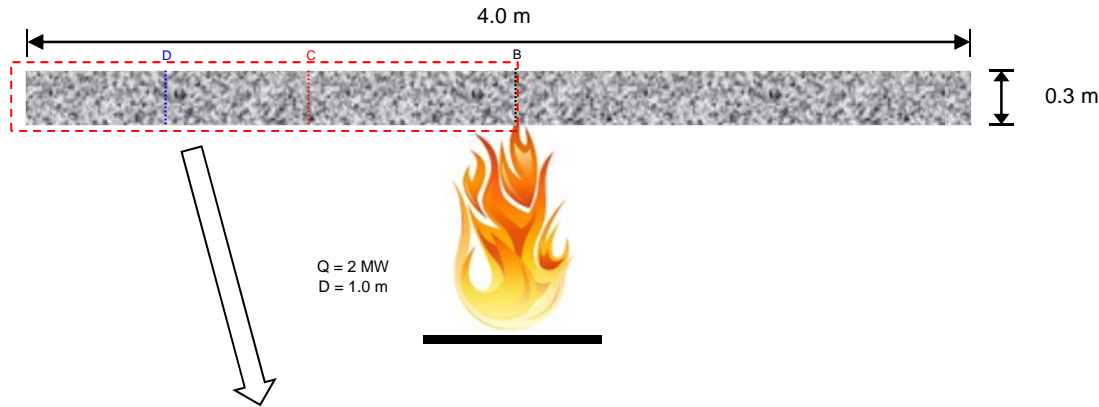
Verification

- ~~Boundary~~ **BCBC**

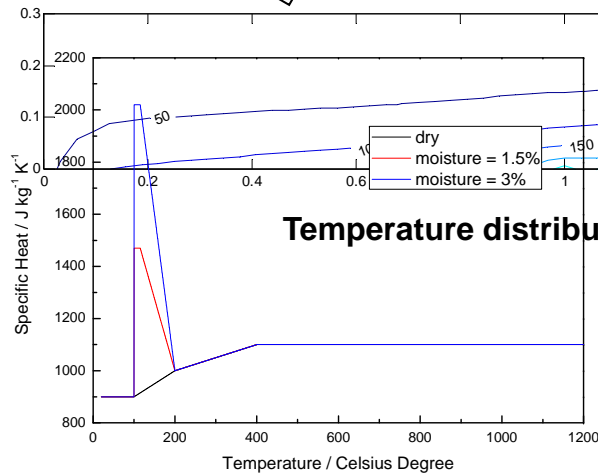


Application

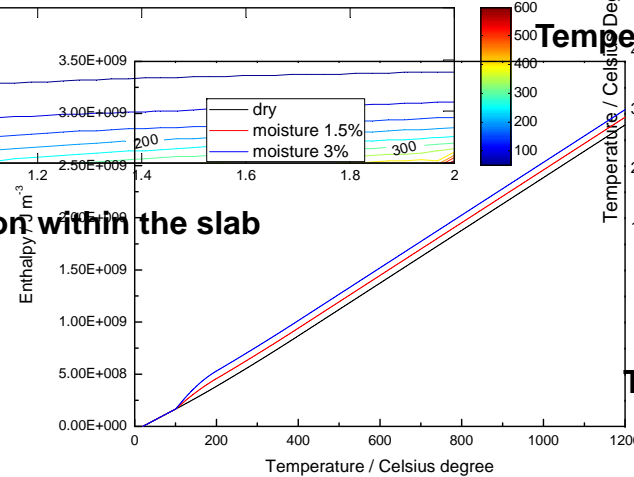
Concrete slab exposed to a localized fire



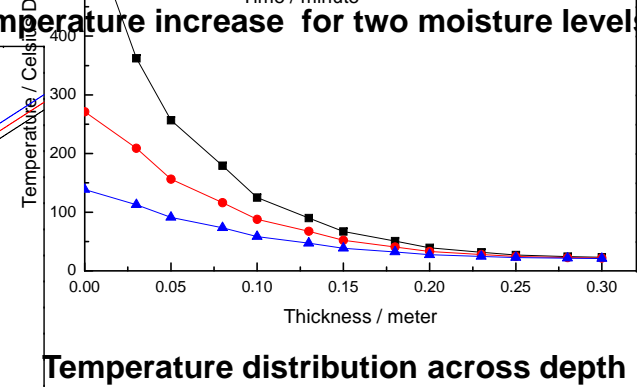
Temperature increase for two moisture levels



Specific heat for concrete(EC2)



Volumetric enthalpy for concrete



Temperature distribution across depth