Class PhaseChange

# Governing equation



 and 



# Discretization

## Spatial discretization

# Structure

phasechange.h

|——phasechange : constructor

|——update : calculate phase change rate

| |——distfunc : distance function

| |——gradphic : normal vector to interface

| |——gradt : grad(T)

| |——m : 

| |——mdot : 

| |——source\_clrs : source term for color function

| |——source\_fext : source term for volume conservation equation

| '——source\_sum : sum source term for statistics

|

'——micro : micro-layer model

|——nucl->st\_active : set nucleation site active or not

|——dmicro\_intermediate : intermediate micro-layer thickness

|——source\_fext : source term for volume conservation equation

|——source\_tprs : source term for enthalpy equation

|——source\_sum : sum source term for cons. statistics

'——str\_dSprev : store dS in previous time step

nucleation.h

|——plant : plant seed

| '——st\_active : set nucleation site active or not

'——replant : replant seed

'——st\_active : set nucleation site active or not

# Prototype etc. (Access from main function)

## Create object

In case of simulation with solid region:

PhaseChange pc (mdot, t, q, c, clrs, f, step, uvw, time, &mixed, latent, tsat, &SUS321);

In case without solid region:

PhaseChange pc (mdot, t, q, c, clrs, f, step, uvw, time, &mixed, latent, tsat);

## update

In case of laminar flow:

pc.update();

In case of turbulent flow:

pc.update( & mu\_t );

Console output:

phasechange\_update: time= 0.010338293 smdot\_pos= 5.5428639e-07 smdot\_neg= -5.1066751e-08



where  is the cell volume.

# Variables

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Form | Description | Unit |
| mdot | Scalar | phase change rate, | kg/sm3 |
| tpr | Scalar | temperature | K or ˚C |
| q | Scalar | source term for enthalpy conservation equation | W |
| clr | Scalar | color function | - |
|  |  |  |  |
| uvw | Vector | flow velocity | m/s |
| time | Times | object of Times |  |
| mixed | Matter | object of fluid material |  |
| latent | real | latent heat | J/kg |
| tsat | real | saturation temperature | K or ˚C |
|  |  |  |  |

# Member functions