Dikes Overtopping Kernel - Technical documentation

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3.1 File List

Here is a list of all files with brief descriptions:

Chapter 4

Module Documentation

4.1 dllovertopping Module Reference

Main entry for the dll DikesOvertopping.

Functions/Subroutines

- subroutine, public calculateqo (load, geometryInput, dikeHeight, modelFactors, overtopping, success, error↩ Text, verbosity, logFile)

  Subroutine that calculates the discharge needed for the Z-function DikesOvertopping Wrapper for calculateQoF↩ : convert C-like input structures to Fortran input structures.
- subroutine, public calculateqoj (load, xcoords, ycoords, roughness, normal, npoints, dikeHeight, model↩ Factors, output, succes, errorMessage)

  Subroutine that calculates the discharge Wrapper for calculateQoF: convert basic types to Fortran input structures.
- subroutine, public calculateqof (load, geometryF, dikeHeight, modelFactors, overtopping, success, errorText, logging)

  Subroutine that calculates the discharge needed for the Z-function DikesOvertopping.
- subroutine, public calczvalue (criticalOvertoppingRate, modelFactors, Qo, z, success, errorMessage)

  Subroutine that calculates the Z-function DikesOvertopping based on the discharge calculated with calculateQoF.
- subroutine, public validateinputc (geometryInput, dikeHeight, modelFactors, success, errorText)

  Subroutine that validates the geometry Wrapper for ValidateInputF: convert C-like input structures to Fortran input structures.
- subroutine, public validateinputj (x, y, roughness, normal, nPoints, dikeHeight, modelFactorsArray, success, errorText)

  Subroutine that validates the geometry Wrapper for ValidateInputF: convert basic types to Fortran input structures.
- subroutine, public validateinputf (geometryF, dikeHeight, modelFactors, errorStruct)

  Subroutine that validates the geometry.
- subroutine, public omkeervariantj (load, xcoords, ycoords, roughness, normal, npoints, givenDischarge, dikeHeight, modelFactors, output, succes, errorMessage)

  Wrapper for omkeerVariantF: get dikeHeight by given discharge.
- subroutine, public omkeervariantf (load, geometryF, givenDischarge, dikeHeight, modelFactors, overtopping, success, errorText, logging)

  Subroutine with omkeerVariant (get dikeHeight by given discharge)
- subroutine, public setlanguage (lang)

  Subroutine that sets the language for error and validation messages.
- subroutine, public getlanguage (lang)

  Subroutine that gets the language for error and validation messages.
- subroutine, public versionnumber (version)

Subroutine that delivers the version number.

- type(overtoppinggeometrytypef) function geometry_c_f (geometryInput)

  Private subroutine that converts geometry from c-pointer to fortran struct.

- subroutine input_j_f (x, y, roughness, normal, geometryF, modelFactorsJ, modelFactorsF, loadJ, loadF)

  convert java input to Fortran input

Variables

- character, parameter separationchar = char(9)

  use horizontal tab for separation

4.1.1 Detailed Description

Main entry for the dll DikesOvertopping.

4.1.2 Function/Subroutine Documentation

4.1.2.1 subroutine, public dllovertopping::calculateqo (type(tpload), intent(in) *load,* type(overtoppinggeometrytype), intent(in) *geometryInput,* real(kind=wp), intent(in) *dikeHeight,* type(tpovertoppinginput), intent(inout) *modelFactors,* type (tpovertopping), intent(out) *overtopping,* logical, intent(out) *success,* character(len=∗), intent(out) *errorText,* integer, intent(in) *verbosity,* character(len=∗), intent(in) *logFile*)

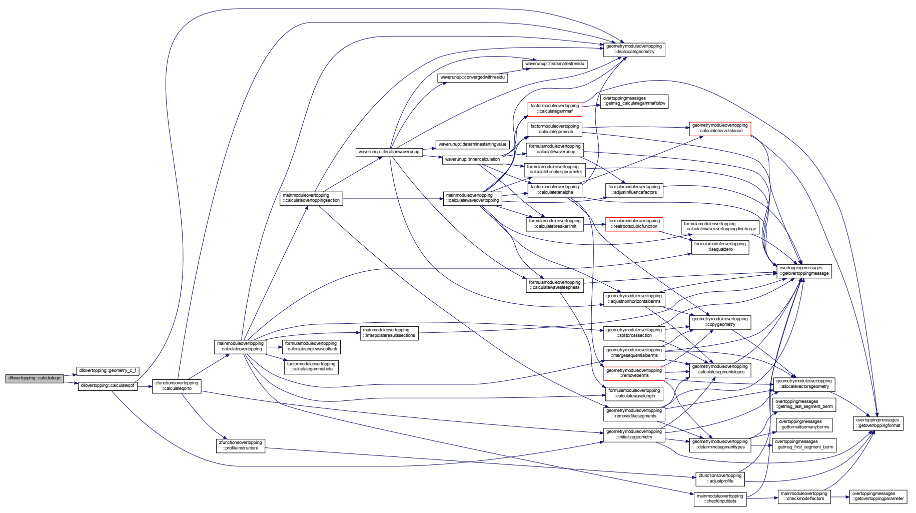
Subroutine that calculates the discharge needed for the Z-function DikesOvertopping Wrapper for calculateQoF: convert C-like input structures to Fortran input structures.

Parameters

`in`	*geometryinput*	struct with geometry and roughness as c-pointers
`in`	*load*	struct with waterlevel and wave parameters
`in`	*dikeheight*	dike height
`in,out`	*modelfactors*	struct with modelfactors
`out`	*overtopping*	structure with overtopping results
`out`	*success*	flag for success
`out`	*errortext*	error message (only set if not successful)
`in`	*verbosity*	level of verbosity
`in`	*logfile*	filename of logfile

Definition at line 71 of file dllOvertopping.f90.

Here is the call graph for this function:


dllovertopping::calculateqo
dllovertopping::geometry_c_f
dllovertopping::calculateqof
zfunctionsovertopping ::calculateqorto
zfunctionsovertopping ::profileinstructure
mainmoduleovertopping ::calculateovertopping
formulamoduleovertopping ::calculateanglewaveattack
factormoduleovertopping ::calculategammabeta
mainmoduleovertopping ::interpolateresultssections
mainmoduleovertopping ::calculateovertoppingsection
waverunup::iterationwaverunup
waverunup::convergedwithresidu
waverunup::findsmallestresidu
waverunup::determinestartingvalue
waverunup::innercalculation
mainmoduleovertopping ::calculatewaveovertopping
geometrymoduleovertopping ::deallocategeometry
factormoduleovertopping ::calculategammaf
overtoppingmessages ::getmsg_calculategammaftolow
factormoduleovertopping ::calculategammab
geometrymoduleovertopping ::calculatehorzdistance
formulamoduleovertopping ::calculatewaverunup
formulamoduleovertopping ::calculatebreakerparameter
factormoduleovertopping ::calculatetanalpha
formulamoduleovertopping ::adjustinfluencefactors
formulamoduleovertopping ::calculatebreakerlimit
formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::calculatewaveovertoppingdischarge
formulamoduleovertopping ::isequalzero
overtoppingmessages ::getovertoppingmessage
formulamoduleovertopping ::calculatewavesteepness
geometrymoduleovertopping ::adjustnonhorizontalberms
geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::splitcrosssection
geometrymoduleovertopping ::mergesequentialberms
geometrymoduleovertopping ::removeberms
geometrymoduleovertopping ::calculatesegmentslopes
formulamoduleovertopping ::calculatewavelength
geometrymoduleovertopping ::removedikesegments
geometrymoduleovertopping ::allocatevectorsgeometry
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms
overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::initializegeometry
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_first_segment_berm
zfunctionsovertopping ::adjustprofile
mainmoduleovertopping ::checkinputdata
mainmoduleovertopping ::checkmodelfactors
overtoppingmessages ::getovertoppingparameter

4.1.2.2 subroutine, public dllovertopping::calculateqof (type(tpload), intent(in) *load,* type(overtoppinggeometrytypef), intent(in) *geometryF,* real(kind=wp), intent(in) *dikeHeight,* type(tpovertoppinginput), intent(inout) *modelFactors,* type (tpovertopping), intent(out) *overtopping,* logical, intent(out) *success,* character(len=∗), intent(out) *errorText,* type(tlogging), intent(in) *logging*)

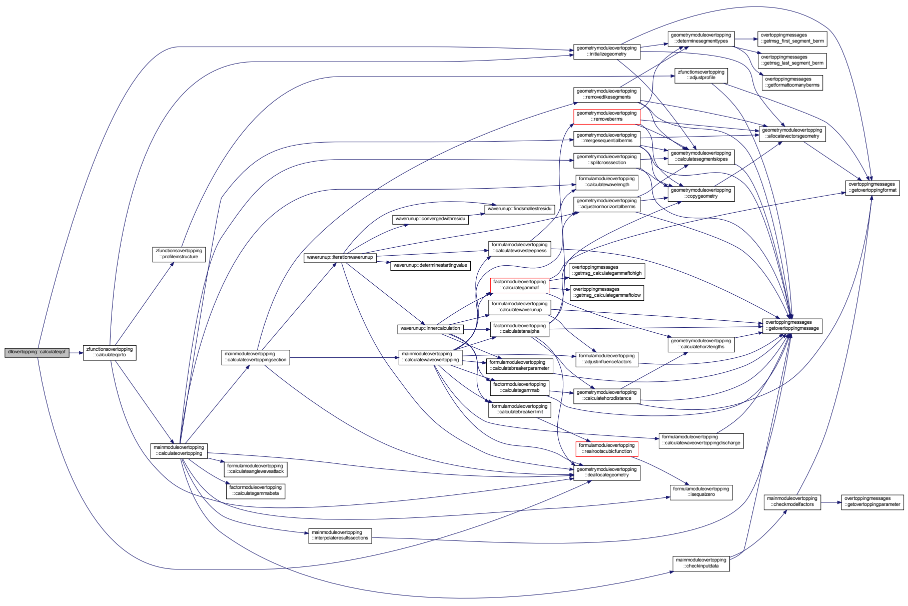
Subroutine that calculates the discharge needed for the Z-function DikesOvertopping.

Parameters

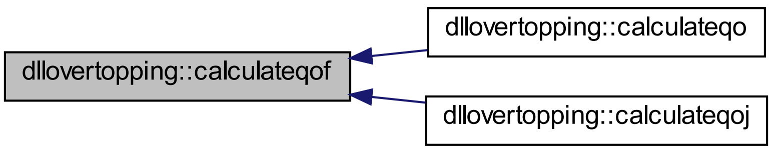
`in`	*geometryf*	struct with geometry and roughness
`in`	*load*	struct with waterlevel and wave parameters
`in`	*dikeheight*	dike height
`in,out`	*modelfactors*	struct with modelFactors
`out`	*overtopping*	structure with overtopping results
`out`	*success*	flag for success
`out`	*errortext*	error message (only set if not successful)
`in`	*logging*	logging struct

Definition at line 144 of file dllOvertopping.f90.

Here is the call graph for this function:


dllovertopping::calculateqof
zfunctionsovertopping ::calculateqorto
zfunctionsovertopping ::profileinstructure
mainmoduleovertopping ::calculateovertopping
mainmoduleovertopping ::calculateovertoppingsection
formulamoduleovertopping ::calculateanglewaveattack
factormoduleovertopping ::calculategammabeta
mainmoduleovertopping ::interpolateresultssections
waverunup::iterationwaverunup
waverunup::convergedwithresidu
waverunup::findsmallestresidu
waverunup::determinestartingvalue
waverunup::innercalculation
mainmoduleovertopping ::calculatewaveovertopping
formulamoduleovertopping ::calculatewavesteepness
factormoduleovertopping ::calculategammaf
formulamoduleovertopping ::calculatewaverunup
factormoduleovertopping ::calculatetanalpha
formulamoduleovertopping ::calculatebreakerparameter
factormoduleovertopping ::calculategammab
formulamoduleovertopping ::calculatebreakerlimit
geometrymoduleovertopping ::initializegeometry
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_first_segment_berm
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms
zfunctionsovertopping ::adjustprofile
geometrymoduleovertopping ::removedikesegments
geometrymoduleovertopping ::removeberms
geometrymoduleovertopping ::mergesequentialberms
geometrymoduleovertopping ::splitcrosssection
formulamoduleovertopping ::calculatewavelength
geometrymoduleovertopping ::adjustnonhorizontalberms
geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::calculatesegmentslopes
geometrymoduleovertopping ::copygeometry
overtoppingmessages ::getovertoppingformat
overtoppingmessages ::getmsg_calculategammaftohigh
overtoppingmessages ::getmsg_calculategammaftolow
overtoppingmessages ::getovertoppingmessage
geometrymoduleovertopping ::calculatehorzlengths
formulamoduleovertopping ::adjustinfluencefactors
geometrymoduleovertopping ::calculatehorzdistance
formulamoduleovertopping ::calculatewaveovertoppingdischarge
formulamoduleovertopping ::realrootscubicfunction
geometrymoduleovertopping ::deallocategeometry
formulamoduleovertopping ::isequalzero
mainmoduleovertopping ::checkmodelfactors
overtoppingmessages ::getovertoppingparameter
mainmoduleovertopping ::checkinputdata

Here is the caller graph for this function:


dllovertopping::calculateqo
dllovertopping::calculateqof
dllovertopping::calculateqoj

4.1.2.3 subroutine, public dllovertopping::calculateqoj (real(kind=wp), dimension(4), intent(in) *load*, real(kind=wp), dimension(npoints), intent(in) *xcoords*, real(kind=wp), dimension(npoints), intent(in) *ycoords*, real(kind=wp), dimension(npoints-1), intent(in) *roughness*, real(kind=wp), intent(in) *normal*, integer, intent(in) *npoints*, real(kind=wp), intent(in) *dikeHeight*, real(kind=wp), dimension(8), intent(in) *modelFactors*, real(kind=wp), dimension(2), intent(out) *output*, logical, intent(out) *succes*, character(len=256), intent(out) *errorMessage*)

Subroutine that calculates the discharge Wrapper for calculateQoF: convert basic types to Fortran input structures.

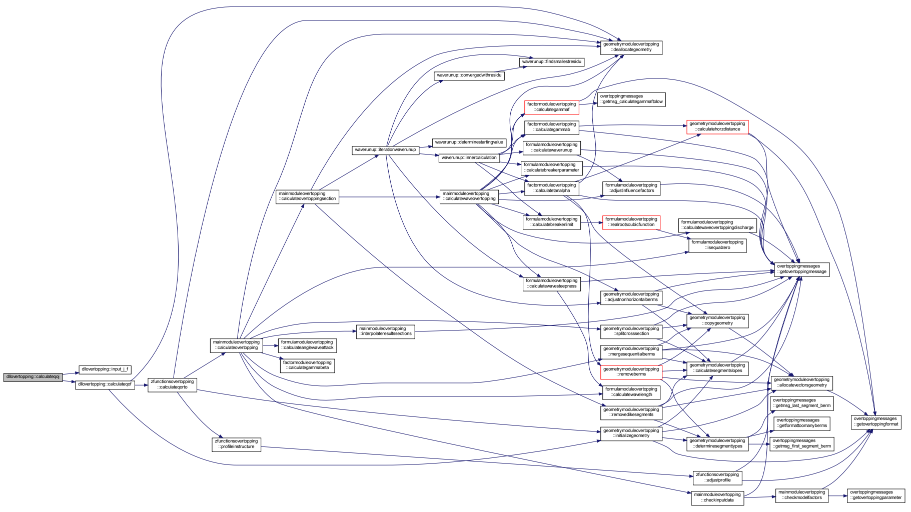
Parameters

`in`	*npoints*	the number of coordinates
`in`	*dikeheight*	dike height
`in`	*normal*	dike normal
`out`	*succes*	flag for success
`out`	*errormessage*	error message (only set if not successful)

`in`	*load*	input load (wl and 3 wave numbers)
`in`	*xcoords*	the x coordinates
`in`	*ycoords*	the y coordinates
`in`	*roughness*	the roughness at sections
`in`	*modelfactors*	the overtopping modelfactors
`out`	*output*	output array: 1: Qo; 2: Z2

Definition at line 103 of file dllOvertopping.f90.

Here is the call graph for this function:



dllovertopping::calculateqoj
dllovertopping::input_j_f
dllovertopping::calculateqof
zfunctionsovertopping ::calculateqorto
zfunctionsovertopping ::profileinstructure
mainmoduleovertopping ::calculateovertopping
formulamoduleovertopping ::calculateanglewaveattack
factormoduleovertopping ::calculategammabeta
mainmoduleovertopping ::interpolateresultssections
mainmoduleovertopping ::calculateovertoppingsection
waverunup::iterationwaverunup
waverunup::convergedwithresidu
waverunup::findsmallestresidu
waverunup::determinestartingvalue
waverunup::innercalculation
mainmoduleovertopping ::calculatewaveovertopping
geometrymoduleovertopping ::deallocategeometry
factormoduleovertopping ::calculategammaf
overtoppingmessages ::getmsg_calculategammaftolow
factormoduleovertopping ::calculategammab
geometrymoduleovertopping ::calculatehorzdistance
formulamoduleovertopping ::calculatewaverunup
formulamoduleovertopping ::calculatebreakerparameter
factormoduleovertopping ::calculatetanalpha
formulamoduleovertopping ::adjustinfluencefactors
formulamoduleovertopping ::calculatebreakerlimit
formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::calculatewaveovertoppingdischarge
formulamoduleovertopping ::isequalzero
overtoppingmessages ::getovertoppingmessage
formulamoduleovertopping ::calculatewavesteepness
geometrymoduleovertopping ::adjustnonhorizontalberms
geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::splitcrosssection
geometrymoduleovertopping ::mergesequentialberms
geometrymoduleovertopping ::removeberms
geometrymoduleovertopping ::calculatesegmentslopes
geometrymoduleovertopping ::allocatevectorsgeometry
formulamoduleovertopping ::calculatewavelength
overtoppingmessages ::getmsg_last_segment_berm
geometrymoduleovertopping ::removedikesegments
overtoppingmessages ::getformattoomanyberms
overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::initializegeometry
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_first_segment_berm
zfunctionsovertopping ::adjustprofile
mainmoduleovertopping ::checkinputdata
mainmoduleovertopping ::checkmodelfactors
overtoppingmessages ::getovertoppingparameter

4.1.2.4 subroutine, public dllovertopping::calczvalue (real(kind=wp), intent(in) *criticalOvertoppingRate*, type(tpovertoppinginput), intent(inout) *modelFactors*, real(kind=wp), intent(in) *Qo*, real(kind=wp), intent(out) *z*, logical, intent(out) *success*, character(len=∗), intent(out) *errorMessage*)

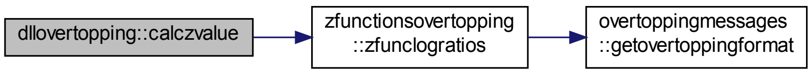
Subroutine that calculates the Z-function DikesOvertopping based on the discharge calculated with calculateQoF.

Parameters

`in`	*criticalovertop-pingrate*	critical overtoppingrate
`in,out`	*modelfactors*	struct with modelfactors
`in`	*qo*	calculated discharge
`out`	*z*	z value
`out`	*errormessage*	error message (only if not successful)
`out`	*success*	flag for success

Definition at line 175 of file dllOvertopping.f90.

Here is the call graph for this function:



dllovertopping::calczvalue
zfunctionsovertopping ::zfunclogratios
overtoppingmessages ::getovertoppingformat

4.1.2.5 type(overtoppinggeometrytypef) function dllovertopping::geometry_c_f (type(overtoppinggeometrytype), intent(in) *geometryInput*) [private]

Private subroutine that converts geometry from c-pointer to fortran struct.

Parameters

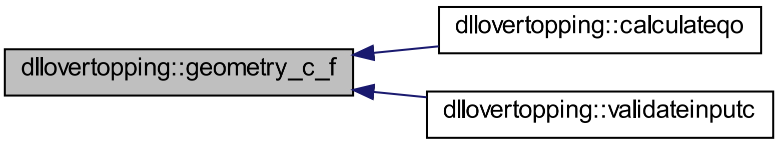
`in`	*geometryinput*	struct with geometry and roughness as c-pointers

Returns

fortran struct with geometry and roughness

Definition at line 501 of file dllOvertopping.f90.

Here is the caller graph for this function:


dllovertopping::geometry_c_f
dllovertopping::calculateqo
dllovertopping::validateinputc

4.1.2.6 subroutine, public dllovertopping::getlanguage (character(len=∗), intent(out) *lang*)

Subroutine that gets the language for error and validation messages.

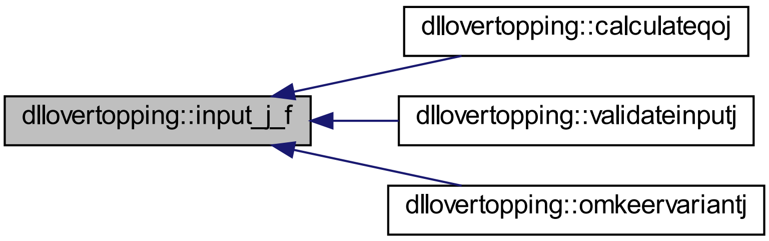
Definition at line 467 of file dllOvertopping.f90.

4.1.2.7 subroutine dllovertopping::input_j_f (real(kind=wp), dimension(:), intent(in) *x,* real(kind=wp), dimension(:), intent(in) *y,* real(kind=wp), dimension(:), intent(in) *roughness,* real(kind=wp), intent(in) *normal,* type(overtoppinggeometrytypef), intent(out) *geometryF,* real(kind=wp), dimension(:), intent(in) *modelFactorsJ,* type(tpovertoppinginput), intent(out) *modelFactorsF,* real(kind=wp), dimension(:), intent(in), optional *loadJ,* type(tpload), intent(out), optional *loadF*)

convert java input to Fortran input

Definition at line 524 of file dllOvertopping.f90.

Here is the caller graph for this function:


dllovertopping::input_j_f
dllovertopping::calculateqoj
dllovertopping::validateinputj
dllovertopping::omkeervariantj

4.1.2.8 subroutine, public dllovertopping::omkeervariantf (type(tpload), intent(in) *load,* type(overtoppinggeometrytypef), intent(in) *geometryF,* real(kind=wp), intent(in) *givenDischarge,* real(kind=wp), intent(out) *dikeHeight,* type(tpovertoppinginput), intent(inout) *modelFactors,* type (tpovertopping), intent(inout) *overtopping,* logical, intent(out) *success,* character(len=∗), intent(out) *errorText,* type(tlogging), intent(in) *logging*)

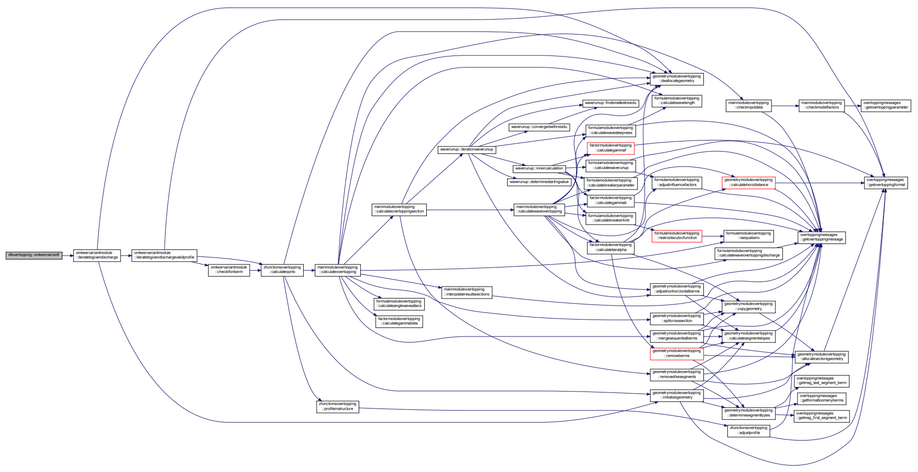
Subroutine with omkeerVariant (get dikeHeight by given discharge)

Parameters

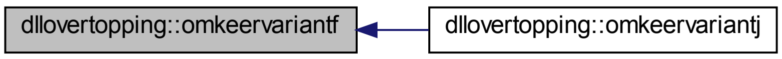
`in`	*geometryf*	struct with geometry and roughness
`in`	*load*	struct with waterlevel and wave parameters
`in`	*givendischarge*	discharge to iterate to
`out`	*dikeheight*	dike height
`in,out`	*modelfactors*	struct with modelFactors
`in,out`	*overtopping*	structure with overtopping results
`out`	*success*	flag for success
`out`	*errortext*	error message (only set if not successful)
`in`	*logging*	logging struct

Definition at line 431 of file dllOvertopping.f90.

Here is the call graph for this function:



Here is the caller graph for this function:


dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.1.2.9 subroutine, public dllovertopping::omkeervariantj (real(kind=wp), dimension(4), intent(in) *load,* real(kind=wp), dimension(npoints), intent(in) *xcoords,* real(kind=wp), dimension(npoints), intent(in) *ycoords,* real(kind=wp), dimension(npoints-1), intent(in) *roughness,* real(kind=wp), intent(in) *normal,* integer, intent(in) *npoints,* real(kind=wp), intent(in) *givenDischarge,* real(kind=wp), intent(out) *dikeHeight,* real(kind=wp), dimension(8), intent(in) *modelFactors,* real(kind=wp), dimension(2), intent(out) *output,* logical, intent(out) *succes,* character(len=256), intent(out) *errorMessage*)

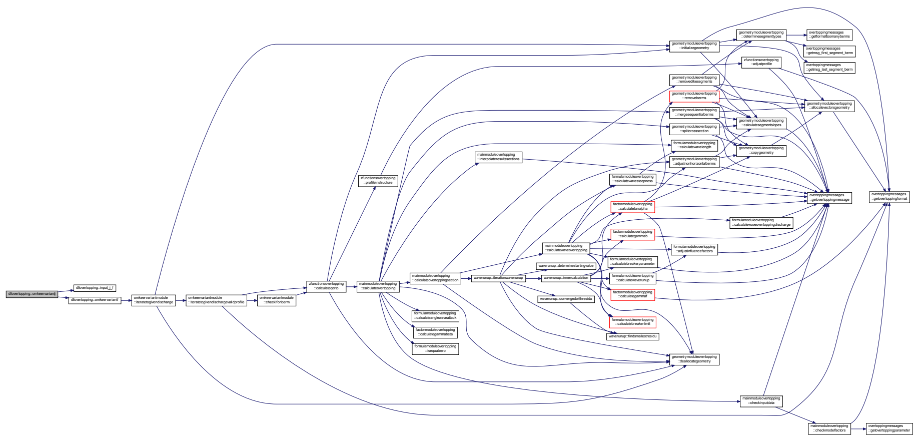
Wrapper for omkeerVariantF: get dikeHeight by given discharge.

Parameters

in	*npoints*	number of coordinates
in	*givendischarge*	input discharge
out	*dikeheight*	dike height
in	*normal*	dike normal
out	*succes*	flag for success
out	*errormessage*	error message (only set if not successful)
in	*load*	input load (wl, and 3 wave parameters)
in	*xcoords*	the x-coordinates
in	*ycoords*	the y-coordinates
in	*roughness*	the roughness at sections
in	*modelfactors*	the overtopping modelfactors
out	*output*	output array: 1: Z2; 2: Qo

Definition at line 388 of file dllOvertopping.f90.

Here is the call graph for this function:



4.1.2.10 subroutine, public dllovertopping::setlanguage (character(len=∗), intent(in) *lang*)

Subroutine that sets the language for error and validation messages.

Definition at line 454 of file dllOvertopping.f90.

4.1.2.11 subroutine, public dllovertopping::validateinputc (type(overtoppinggeometrytype), intent(in) *geometryInput,* real(kind=wp), intent(in) *dikeHeight,* type(tpovertoppinginput), intent(inout) *modelFactors,* logical, intent(out) *success,* character(len=∗), intent(out) *errorText*)

Subroutine that validates the geometry Wrapper for ValidateInputF: convert C-like input structures to Fortran input structures.

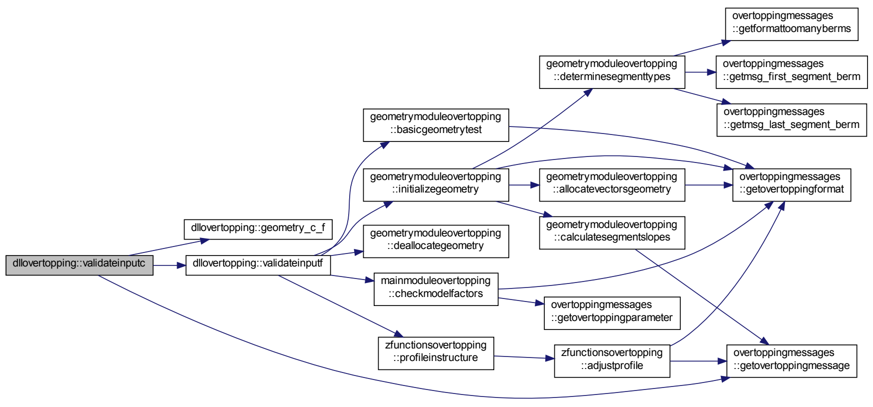
Parameters

in	*geometryinput*	struct with geometry and roughness as c-pointers
in	*dikeheight*	dike height
in,out	*modelfactors*	struct with modelfactors
out	*success*	flag for success

`out`	*errortext*	error message (only set if not successful)

Definition at line 195 of file dllOvertopping.f90.

Here is the call graph for this function:


dllovertopping::validateinputc
dllovertopping::geometry_c_f
dllovertopping::validateinputf
geometrymoduleovertopping ::basicgeometrytest
geometrymoduleovertopping ::initializegeometry
geometrymoduleovertopping ::deallocategeometry
mainmoduleovertopping ::checkmodelfactors
zfunctionsovertopping ::profileinstructure
geometrymoduleovertopping ::determinesegmenttypes
geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::calculatesegmentslopes
overtoppingmessages ::getovertoppingparameter
zfunctionsovertopping ::adjustprofile
overtoppingmessages ::getformattoomanyberms
overtoppingmessages ::getmsg_first_segment_berm
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getovertoppingformat
overtoppingmessages ::getovertoppingmessage

4.1.2.12 subroutine, public dllovertopping::validateinputf (type(overtoppinggeometrytypef), intent(in) *geometryF,* real(kind=wp), intent(in) *dikeHeight,* type(tpovertoppinginput), intent(inout) *modelFactors,* type(terrormessages), intent(inout) *errorStruct*)

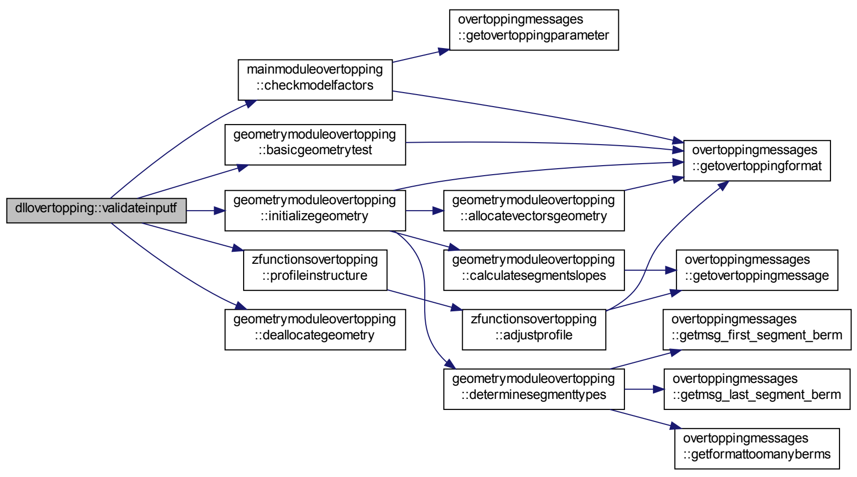
Subroutine that validates the geometry.

Parameters

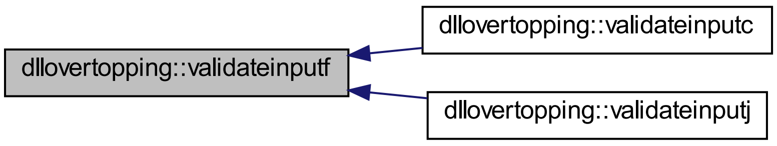
`in`	*geometryf*	struct with geometry and roughness
`in`	*dikeheight*	dike height
`in,out`	*modelfactors*	struct with modelFactors
`in,out`	*errorstruct*	error message (only set if not successful)

Definition at line 308 of file dllOvertopping.f90.

Here is the call graph for this function:


overtoppingmessages ::getovertoppingparameter
mainmoduleovertopping ::checkmodelfactors
geometrymoduleovertopping ::basicgeometrytest
overtoppingmessages ::getovertoppingformat
dllovertopping::validateinputf
geometrymoduleovertopping ::initializegeometry
geometrymoduleovertopping ::allocatevectorsgeometry
zfunctionsovertopping ::profileinstructure
geometrymoduleovertopping ::calculatesegmentslopes
overtoppingmessages ::getovertoppingmessage
geometrymoduleovertopping ::deallocategeometry
zfunctionsovertopping ::adjustprofile
overtoppingmessages ::getmsg_first_segment_berm
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms

Here is the caller graph for this function:


dllovertopping::validateinputf
dllovertopping::validateinputc
dllovertopping::validateinputj

4.1.2.13 subroutine, public dllovertopping::validateinputj (real(kind=wp), dimension(npoints), intent(in) *x*, real(kind=wp), dimension(npoints), intent(in) *y*, real(kind=wp), dimension(npoints-1), intent(in) *roughness*, real(kind=wp), intent(in) *normal*, integer, intent(in) *nPoints*, real(kind=wp), intent(in) *dikeHeight*, real(kind=wp), dimension(8), intent(in) *modelFactorsArray*, logical, intent(out) *success*, character(len=256), intent(out) *errorText*)

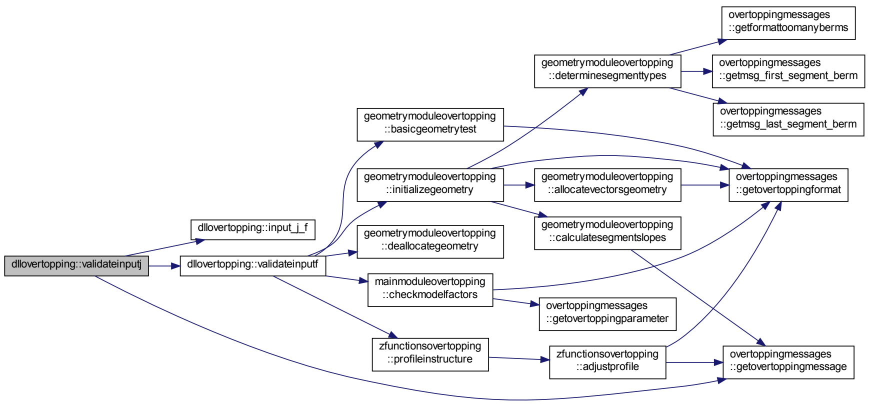
Subroutine that validates the geometry Wrapper for ValidateInputF: convert basic types to Fortran input structures.

Parameters

in	*npoints*	number of profile points
in	*x*	x coordinates of profile
in	*y*	y coordinates of profile
in	*roughness*	roughness of profile sections
in	*normal*	dike normal
in	*dikeheight*	dike height
in	*modelfactorsarray*	array with modelfactors
out	*success*	flag for success
out	*errortext*	error message (only set if not successful)

Definition at line 246 of file dllOvertopping.f90.

Here is the call graph for this function:


dllovertopping::validateinputj
dllovertopping::input_j_f
dllovertopping::validateinputf
geometrymoduleovertopping ::basicgeometrytest
geometrymoduleovertopping ::initializegeometry
geometrymoduleovertopping ::deallocategeometry
mainmoduleovertopping ::checkmodelfactors
zfunctionsovertopping ::profileinstructure
geometrymoduleovertopping ::determinesegmenttypes
geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::calculatesegmentslopes
overtoppingmessages ::getovertoppingparameter
zfunctionsovertopping ::adjustprofile
overtoppingmessages ::getformattoomanyberms
overtoppingmessages ::getmsg_first_segment_berm
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getovertoppingformat
overtoppingmessages ::getovertoppingmessage

4.1.2.14 subroutine, public dllovertopping::versionnumber (character(len=∗), intent(out) *version*)

Subroutine that delivers the version number.

Parameters

out	*version*	version number

Definition at line 479 of file dllOvertopping.f90.

4.1.3 Variable Documentation

4.1.3.1 character, parameter dllovertopping::separationchar = char(9)

use horizontal tab for separation

Definition at line 61 of file dllOvertopping.f90.

4.2 factormoduleovertopping Module Reference

functions for the slope angle and influence factors

Functions/Subroutines

- subroutine, public calculatetanalpha (h, Hm0, z2, geometry, tanAlpha, succes, errorMessage)

  calculateTanAlpha representative slope angle
- subroutine, public calculategammabeta (Hm0, Tm_10, beta, gammaBeta_z, gammaBeta_o)

  calculateGammaBeta influence factor angle of wave attack
- subroutine, public calculategammaf (h, ksi0, ksi0Limit, gammaB, z2, geometry, gammaF, succes, error↵
  Message)

  calculateGammaF influence factor roughness
- subroutine, public calculategammab (h, Hm0, z2, geometry, gammaB, succes, errorMessage)

  calculateGammaB influence factor berms

4.2.1 Detailed Description

functions for the slope angle and influence factors

4.2.2 Function/Subroutine Documentation

4.2.2.1 subroutine, public factormoduleovertopping::calculategammab (real(kind=wp), intent(in) *h*, real(kind=wp), intent(in) *Hm0*, real(kind=wp), intent(in) *z2*, type(tpgeometry), intent(in) *geometry*, real(kind=wp), intent(out) *gammaB*, logical, intent(out) *succes*, character(len=∗), intent(out) *errorMessage*)

calculateGammaB influence factor berms

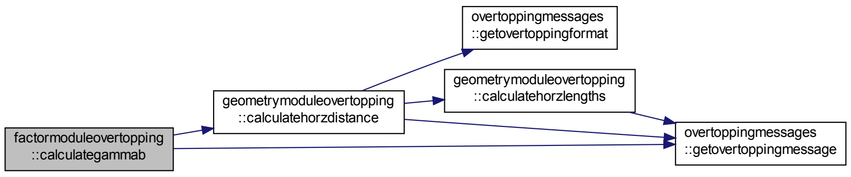
Parameters

in	*h*	local water level (m+NAP)
in	*hm0*	significant wave height (m)
in	*z2*	2% wave run-up (m)
in	*geometry*	structure with geometry data
out	*gammab*	influence factor berms

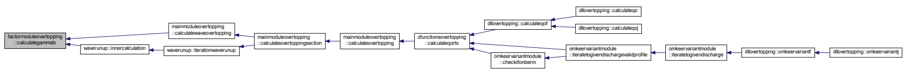
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 317 of file factorModuleOvertopping.f90.

Here is the call graph for this function:


factormoduleovertopping ::calculategammab
geometrymoduleovertopping ::calculatehorzdistance
overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::calculatehorzlengths
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


factormoduleovertopping ::calculategammab
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.2.2.2 subroutine, public factormoduleovertopping::calculategammabeta (real(kind=wp), intent(inout) *Hm0,* real(kind=wp), intent(inout) *Tm_10,* real(kind=wp), intent(in) *beta,* real(kind=wp), intent(out) *gammaBeta_z,* real(kind=wp), intent(out) *gammaBeta_o*)

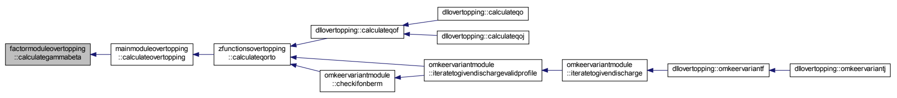
calculateGammaBeta influence factor angle of wave attack

Parameters

in,out	*hm0*	significant wave height (m)
in,out	*tm_10*	spectral wave period (s)
in	*beta*	angle of wave attack (degree)
out	*gammabeta_z*	influence factor angle of wave attack 2% wave run-up
out	*gammabeta_o*	influence factor angle of wave attack overtopping

Definition at line 139 of file factorModuleOvertopping.f90.

Here is the caller graph for this function:


factormoduleovertopping ::calculategammabeta
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.2.2.3 subroutine, public factormoduleovertopping::calculategammaf (real(kind=wp), intent(in) *h,* real(kind=wp), intent(in) *ksi0,* real(kind=wp), intent(in) *ksi0Limit,* real(kind=wp), intent(in) *gammaB,* real(kind=wp), intent(in) *z2,* type(tpgeometry), intent(in) *geometry,* real(kind=wp), intent(out) *gammaF,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

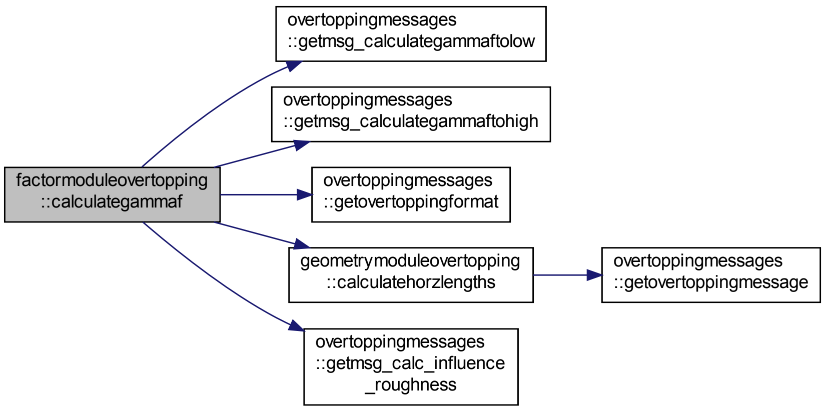
calculateGammaF influence factor roughness

Parameters

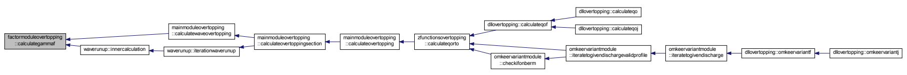
in	*h*	local water level (m+NAP)
in	*ksi0*	breaker parameter
in	*ksi0limit*	limit value breaker parameter
in	*gammab*	influence factor berms
in	*z2*	2% wave run-up (m)
in	*geometry*	structure with geometry data
out	*gammaf*	influence factor roughness
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 179 of file factorModuleOvertopping.f90.

Here is the call graph for this function:


factormoduleovertopping ::calculategammaf
overtoppingmessages ::getmsg_calculategammaftolow
overtoppingmessages ::getmsg_calculategammaftohigh
overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::calculatehorzlengths
overtoppingmessages ::getovertoppingmessage
overtoppingmessages ::getmsg_calc_influence _roughness

Here is the caller graph for this function:


factormoduleovertopping ::calculategammaf
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.2.2.4 subroutine, public factormoduleovertopping::calculatetanalpha (real(kind=wp), intent(in) *h*, real(kind=wp), intent(in) *Hm0*, real(kind=wp), intent(in) *z2*, type(tpgeometry), intent(in) *geometry*, real(kind=wp), intent(out) *tanAlpha*, logical, intent(out) *succes*, character(len=∗), intent(out) *errorMessage*)

calculateTanAlpha representative slope angle

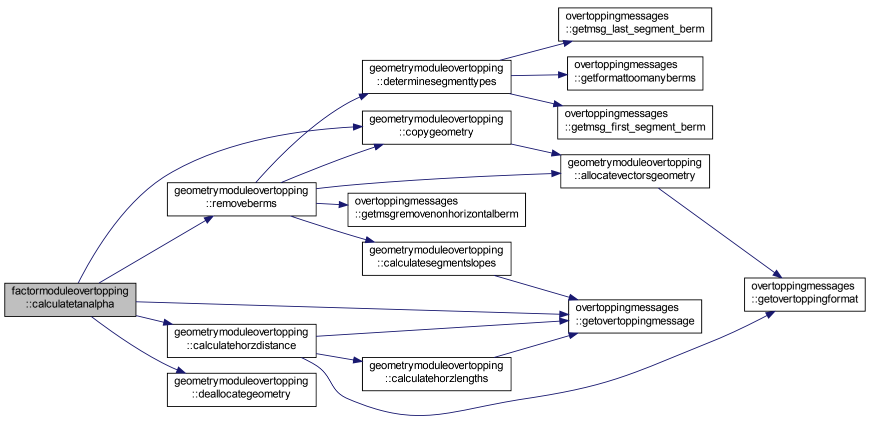
Parameters

in	*h*	local water level (m+NAP)
in	*hm0*	significant wave height (m)
in	*z2*	2% wave run-up (m)
in	*geometry*	structure with geometry data

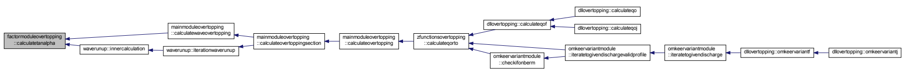
out	*tanalpha*	representative slope angle
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 60 of file factorModuleOvertopping.f90.

Here is the call graph for this function:


overtoppingmessages ::getmsg_last_segment_berm
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getformattoomanyberms
overtoppingmessages ::getmsg_first_segment_berm
geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::removeberms
overtoppingmessages ::getmsgremovenonhorizontalberm
geometrymoduleovertopping ::calculatesegmentslopes
overtoppingmessages ::getovertoppingformat
factormoduleovertopping ::calculatetanalpha
overtoppingmessages ::getovertoppingmessage
geometrymoduleovertopping ::calculatehorzdistance
geometrymoduleovertopping ::calculatehorzlengths
geometrymoduleovertopping ::deallocategeometry

Here is the caller graph for this function:


factormoduleovertopping ::calculatetanalpha
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3 formulamoduleovertopping Module Reference

the core computations for Dikes Overtopping

Functions/Subroutines

- subroutine, public calculatewaverunup (Hm0, ksi0, ksi0Limit, gammaB, gammaF, gammaBeta, modelFactors, z2, succes, errorMessage)

  calculateWaveRunup: calculate wave runup
- subroutine, public calculatewaveovertoppingdischarge (h, Hm0, tanAlpha, gammaB, gammaF, gammaBeta, ksi0, hCrest, modelFactors, Qo, succes, errorMessage)

  calculateWaveOvertoppingDischarge: calculate the wave overtopping discharge
- subroutine, public calculatewavelength (Tm_10, L0)

  calculateWaveLength: calculate the wave length
- subroutine, public calculatewavesteepness (Hm0, Tm_10, s0, succes, errorMessage)

  calculateWaveSteepness: calculate the wave steepness
- subroutine, public calculatebreakerparameter (tanAlpha, s0, ksi0, succes, errorMessage)

  calculateBreakerParameter: calculate the breaker parameter
- subroutine, public calculateanglewaveattack (phi, psi, beta)

  calculateAngleWaveAttack: calculate the angle of wave attack
- subroutine, public calculatebreakerlimit (gammaB, ksi0Limit, succes, errorMessage)

  calculateBreakerLimit: calculate the breaker limit

- subroutine, public adjustinfluencefactors (gammaB, gammaF, gammaBeta, gammaBetaType, ksi0, ksi0Limit, succes, errorMessage)

  adjustInfluenceFactors: adjust the influence factors
- subroutine realrootscubicfunction (a, b, c, d, N, x, succes, errorMessage)

  realRootsCubicFunction: calculate the roots of a cubic function
- subroutine rootsgeneralcubic (a, b, c, d, z, succes, errorMessage)

  rootsGeneralCubic: calculate the roots of a generic cubic function
- subroutine rootsdepressedcubic (p, q, z)

  rootsDepressedCubic: calculate the roots of a depressed cubic function
- subroutine cubicroots (z, roots)

  cubicRoots: calculate the roots of a cubic function
- logical function, public isequalreal (x1, x2)

  isEqualReal: are two reals (almost) equal
- logical function, public isequalzero (x)

  isEqualZero: is a real (almost) zero

4.3.1 Detailed Description

the core computations for Dikes Overtopping

4.3.2 Function/Subroutine Documentation

4.3.2.1 subroutine, public formulamoduleovertopping::adjustinfluencefactors (real(kind=wp), intent(inout) *gammaB,* real(kind=wp), intent(inout) *gammaF,* real(kind=wp), intent(inout) *gammaBeta,* integer, intent(in) *gammaBetaType,* real(kind=wp), intent(in) *ksi0,* real(kind=wp), intent(in) *ksi0Limit,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

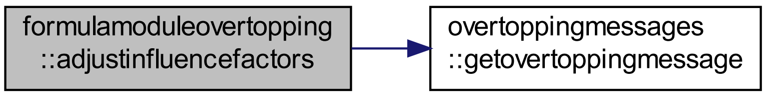
adjustInfluenceFactors: adjust the influence factors

Parameters

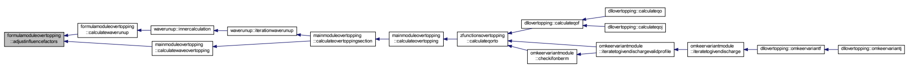
in,out	*gammab*	influence factor berms
in,out	*gammaf*	influence factor roughness
in,out	*gammabeta*	influence factor angle of wave attack
in	*gammabetatype*	type influence factor angle of wave attack: 1 = wave run-up, 2 = overtopping
in	*ksi0*	breaker parameter
in	*ksi0limit*	limit value breaker parameter
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 403 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:


formulamoduleovertopping ::adjustinfluencefactors
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


formulamoduleovertopping ::adjustinfluencefactors
formulamoduleovertopping ::calculatewaverunup
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculatewaveovertopping
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3.2.2 subroutine, public formulamoduleovertopping::calculateanglewaveattack (real(kind=wp), intent(in) *phi,* real(kind=wp), intent(in) *psi,* real(kind=wp), intent(out) *beta*)

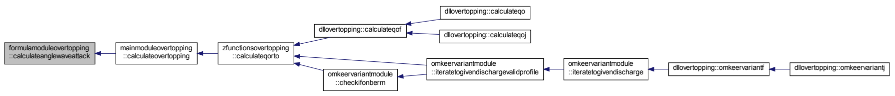
calculateAngleWaveAttack: calculate the angle of wave attack

Parameters

in	*phi*	wave direction (degree)
in	*psi*	dike normal (degree)
out	*beta*	angle of wave attack (degree)

Definition at line 309 of file formulaModuleOvertopping.f90.

Here is the caller graph for this function:

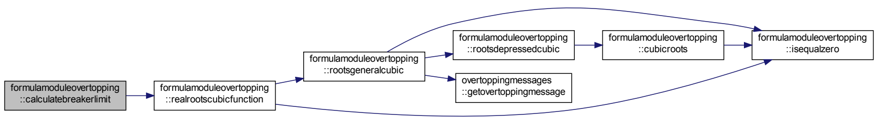

formulamoduleovertopping ::calculateanglewaveattack
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3.2.3 subroutine, public formulamoduleovertopping::calculatebreakerlimit (real(kind=wp), intent(in) *gammaB,* real(kind=wp), intent(out) *ksi0Limit,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

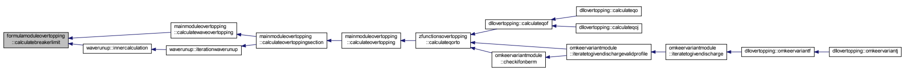
calculateBreakerLimit: calculate the breaker limit

Definition at line 332 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:


formulamoduleovertopping ::calculatebreakerlimit
formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::rootsgeneralcubic
formulamoduleovertopping ::rootsdepressedcubic
overtoppingmessages ::getovertoppingmessage
formulamoduleovertopping ::cubicroots
formulamoduleovertopping ::isequalzero

Here is the caller graph for this function:


formulamoduleovertopping ::calculatebreakerlimit
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3.2.4 subroutine, public formulamoduleovertopping::calculatebreakerparameter (real(kind=wp), intent(in) *tanAlpha,* real(kind=wp), intent(in) *s0,* real(kind=wp), intent(out) *ksi0,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

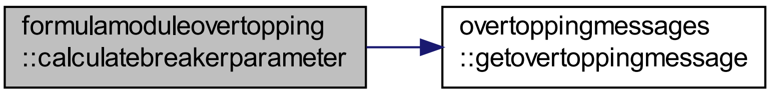
calculateBreakerParameter: calculate the breaker parameter

Parameters

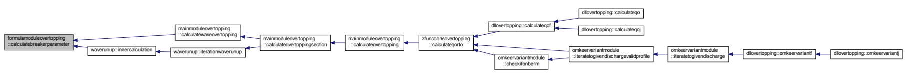
`in`	*tanalpha*	representative slope angle
`in`	*s0*	wave steepness
`out`	*ksi0*	breaker parameter
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 268 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:


formulamoduleovertopping ::calculatebreakerparameter
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


formulamoduleovertopping ::calculatebreakerparameter
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3.2.5 subroutine, public formulamoduleovertopping::calculatewavelength (real(kind=wp), intent(in) *Tm_10,* real(kind=wp), intent(out) *L0*)

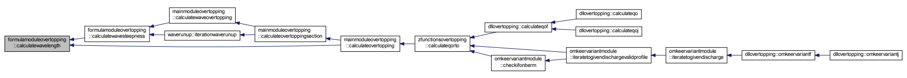
calculateWaveLength: calculate the wave length

Parameters

`in`	*tm_10*	spectral wave period (s)
`out`	*l0*	wave length (m)

Definition at line 205 of file formulaModuleOvertopping.f90.

Here is the caller graph for this function:


formulamoduleovertopping ::calculatewavelength
formulamoduleovertopping ::calculatewavesteepness
mainmoduleovertopping ::calculatewaveovertopping
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3.2.6 subroutine, public formulamoduleovertopping::calculatewaveovertoppingdischarge (real(kind=wp), intent(in) *h,* real(kind=wp), intent(in) *Hm0,* real(kind=wp), intent(in) *tanAlpha,* real(kind=wp), intent(in) *gammaB,* real(kind=wp), intent(in) *gammaF,* real(kind=wp), intent(in) *gammaBeta,* real(kind=wp), intent(in) *ksi0,* real(kind=wp), intent(in) *hCrest,* type(tpovertoppinginput), intent(in) *modelFactors,* real(kind=wp), intent(out) *Qo,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

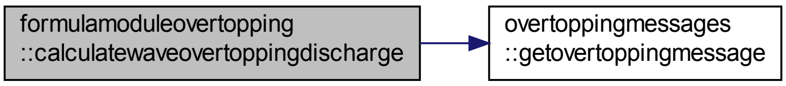
calculateWaveOvertoppingDischarge: calculate the wave overtopping discharge

Parameters

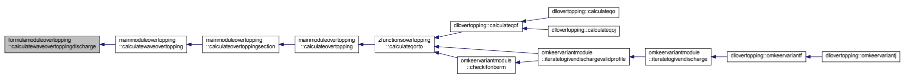
`in`	*h*	local water level (m+NAP)
`in`	*hm0*	significant wave height (m)
`in`	*tanalpha*	representative slope angle
`in`	*gammab*	influence factor berms
`in`	*gammaf*	influence factor roughness
`in`	*gammabeta*	influence factor angle of wave attack
`in`	*ksi0*	breaker parameter
`in`	*hcrest*	crest level (m+NAP)
`in`	*modelfactors*	structure with model factors
`out`	*qo*	wave overtopping discharge (l/m per s)
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 108 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:


formulamoduleovertopping ::calculatewaveovertoppingdischarge
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


formulamoduleovertopping ::calculatewaveovertoppingdischarge
mainmoduleovertopping ::calculatewaveovertopping
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3.2.7 subroutine, public formulamoduleovertopping::calculatewaverunup (real(kind=wp), intent(in) *Hm0,* real(kind=wp), intent(in) *ksi0,* real(kind=wp), intent(in) *ksi0Limit,* real(kind=wp), intent(inout) *gammaB,* real(kind=wp), intent(inout) *gammaF,* real(kind=wp), intent(inout) *gammaBeta,* type (tpovertoppinginput), intent(in) *modelFactors,* real(kind=wp), intent(out) *z2,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

calculateWaveRunup: calculate wave runup

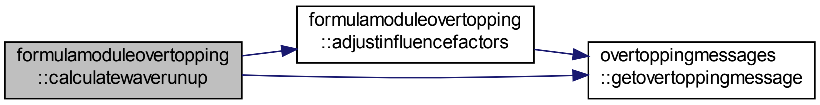
Parameters

`in`	*hm0*	significant wave height (m)
`in`	*ksi0*	breaker parameter
`in`	*ksi0limit*	limit value breaker parameter
`in,out`	*gammab*	influence factor berms
`in,out`	*gammaf*	influence factor roughness
`in,out`	*gammabeta*	influence factor angle of wave attack
`in`	*modelfactors*	structure with model factors
`out`	*z2*	2% wave run-up (m)

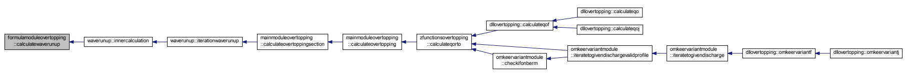
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 59 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:


formulamoduleovertopping ::calculatewaverunup
formulamoduleovertopping ::adjustinfluencefactors
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


formulamoduleovertopping ::calculatewaverunup
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3.2.8 subroutine, public formulamoduleovertopping::calculatewavesteepness (real(kind=wp), intent(in) *Hm0*, real(kind=wp), intent(in) *Tm_10*, real(kind=wp), intent(out) *s0*, logical, intent(out) *succes*, character(len=∗), intent(out) *errorMessage*)

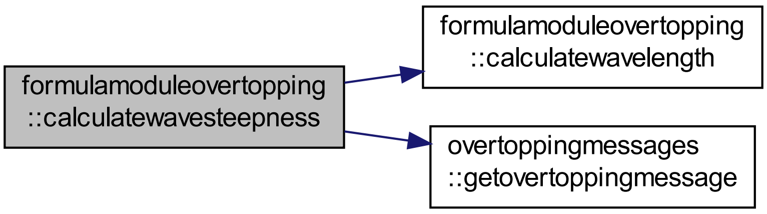
calculateWaveSteepness: calculate the wave steepness

Parameters

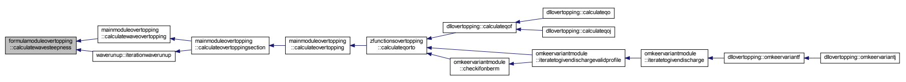
in	*hm0*	significant wave height (m)
in	*tm_10*	spectral wave period (s)
out	*s0*	wave steepness
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 226 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:


formulamoduleovertopping ::calculatewavesteepness
formulamoduleovertopping ::calculatewavelength
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


formulamoduleovertopping
::calculatewavesteepness
mainmoduleovertopping
::calculatewaveovertopping
waverunup::iterationwaverunup
mainmoduleovertopping
::calculateovertoppingsection
mainmoduleovertopping
::calculateovertopping
zfunctionsovertopping
::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule
::checkifonberm
omkeervariantmodule
::iteratetogivendischargevalidprofile
omkeervariantmodule
::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3.2.9 subroutine formulamoduleovertopping::cubicroots (double complex, intent(in) *z*, double complex, dimension(3), intent(out) *roots*) [private]

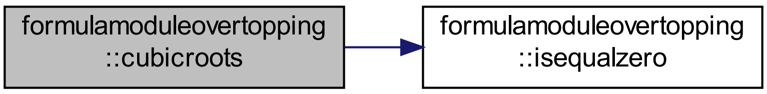
cubicRoots: calculate the roots of a cubic function

Parameters

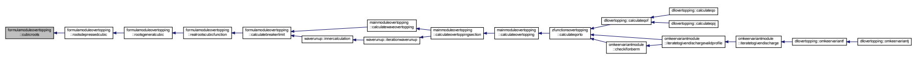
in	*z*	complex number
out	*roots*	cubic roots

Definition at line 651 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:



Here is the caller graph for this function:



4.3.2.10 logical function, public formulamoduleovertopping::isequalreal (real(kind=wp), intent(in) *x1*, real(kind=wp), intent(in) *x2*)

isEqualReal: are two reals (almost) equal

Parameters

in	*x1*	first real
in	*x2*	second real

Definition at line 692 of file formulaModuleOvertopping.f90.

4.3.2.11 logical function, public formulamoduleovertopping::isequalzero (real(kind=wp), intent(in) *x*)

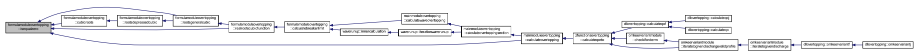
isEqualZero: is a real (almost) zero

Parameters

in	*x*	real number

Definition at line 716 of file formulaModuleOvertopping.f90.

Here is the caller graph for this function:



4.3.2.12 subroutine formulamoduleovertopping::realrootscubicfunction (real(kind=wp), intent(in) *a*, real(kind=wp), intent(in) *b*, real(kind=wp), intent(in) *c*, real(kind=wp), intent(in) *d*, integer, intent(out) *N*, real(kind=wp), dimension(3), intent(out) *x*, logical, intent(out) *succes*, character(len=∗), intent(out) *errorMessage*) [private]

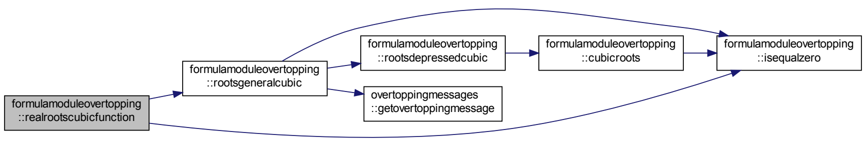
realRootsCubicFunction: calculate the roots of a cubic function

Parameters

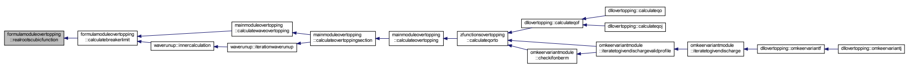
in	*a*	coefficient a cubic function
in	*b*	coefficient b cubic function
in	*c*	coefficient c cubic function
in	*d*	coefficient d cubic function
out	*n*	number of real roots cubic function
out	*x*	real roots cubic function
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 501 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:


formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::rootsgeneralcubic
formulamoduleovertopping ::rootsdepressedcubic
overtoppingmessages ::getovertoppingmessage
formulamoduleovertopping ::cubicroots
formulamoduleovertopping ::isequalzero

Here is the caller graph for this function:



4.3.2.13 subroutine formulamoduleovertopping::rootsdepressedcubic (real(kind=wp), intent(in) *p*, real(kind=wp), intent(in) *q*, double complex, dimension(3), intent(out) *z*) [private]

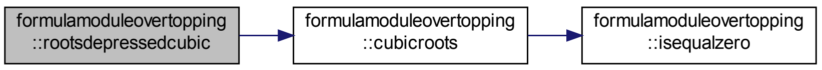
rootsDepressedCubic: calculate the roots of a depressed cubic function

Parameters

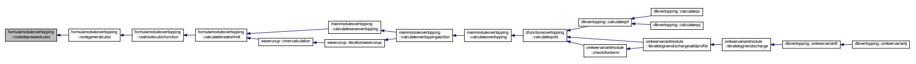
`in`	*p*	coefficient p depressed cubic
`in`	*q*	coefficient q depressed cubic
`out`	*z*	roots depressed cubic

Definition at line 610 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:


formulamoduleovertopping ::rootsdepressedcubic
formulamoduleovertopping ::cubicroots
formulamoduleovertopping ::isequalzero

Here is the caller graph for this function:


formulamoduleovertopping ::rootsdepressedcubic
formulamoduleovertopping ::rootsgeneralcubic
formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::calculatebreakerlimit
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.3.2.14 subroutine formulamoduleovertopping::rootsgeneralcubic (real(kind=wp), intent(in) *a*, real(kind=wp), intent(in) *b*, real(kind=wp), intent(in) *c*, real(kind=wp), intent(in) *d*, double complex, dimension(3), intent(out) *z*, logical, intent(out) *succes*, character(len=∗), intent(out) *errorMessage*) `[private]`

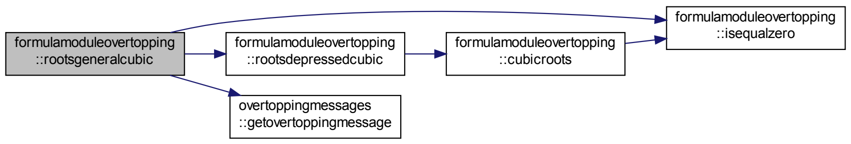
rootsGeneralCubic: calculate the roots of a generic cubic function

Parameters

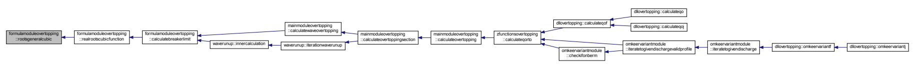
`in`	*a*	coefficients a cubic function
`in`	*b*	coefficients b cubic function
`in`	*c*	coefficients c cubic function
`in`	*d*	coefficients d cubic function
`out`	*z*	roots cubic function
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 557 of file formulaModuleOvertopping.f90.

Here is the call graph for this function:


formulamoduleovertopping ::rootsgeneralcubic
formulamoduleovertopping ::rootsdepressedcubic
formulamoduleovertopping ::cubicroots
formulamoduleovertopping ::isequalzero
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


formulamoduleovertopping ::rootsgeneralcubic
formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::calculatebreakerlimit
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4 geometrymoduleovertopping Module Reference

core computations related to the geometry

Functions/Subroutines

- subroutine, public checkcrosssection (psi, nCoordinates, xCoordinates, yCoordinates, roughnessFactors, succes, errorMessage)

    checkCrossSection: check cross section
- subroutine, public initializegeometry (psi, nCoordinates, xCoordinates, yCoordinates, roughnessFactors, geometry, succes, errorMessage)

    initializeGeometry: initialize the geometry
- subroutine, public allocatevectorsgeometry (nCoordinates, geometry, succes, errorMessage)

    allocateVectorsGeometry: allocate the geometry vectors
- subroutine, public deallocategeometry (geometry)

    deallocateGeometry: deallocate the geometry vectors
- subroutine, public calculatesegmentslopes (geometry, succes, errorMessage)

    calculateSegmentSlopes: calculate the segment slopes
- subroutine, public determinesegmenttypes (geometry, succes, errorMessage)

    determineSegmentTypes: determine the segment types
- subroutine, public copygeometry (geometry, geometryCopy, succes, errorMessage)

    copyGeometry: copy a geometry structure
- subroutine, public mergesequentialberms (geometry, geometryMergedBerms, succes, errorMessage)

    mergeSequentialBerms: merge sequential berms
- subroutine, public adjustnonhorizontalberms (geometry, geometryFlatBerms, succes, errorMessage)

    adjustNonHorizontalBerms: adjust non-horizontal berms
- subroutine, public removeberms (geometry, geometryNoBerms, succes, errorMessage)

    removeBerms: remove berms
- subroutine, public removedikesegments (geometry, index, geometryAdjusted, succes, errorMessage)

    removeDikeSegments: remove dike segments
- subroutine, public splitcrosssection (geometry, L0, NwideBerms, geometrysectionB, geometrysectionF, succes, errorMessage)

    splitCrossSection: split a cross section
- subroutine, public calculatehorzlengths (geometry, yLower, yUpper, horzLengths, succes, errorMessage)

    calculateHorzLengths: calculate horizontal lengths
- subroutine, public calculatehorzdistance (geometry, yLower, yUpper, dx, succes, errorMessage)

    calculateHorzDistance: calculate horizontal distance
- subroutine, public basicgeometrytest (geometryF, success, errorStruct)

    basicGeometryTest: test the input geometry (the adjusted geometry is checked elsewhere)

4.4.1 Detailed Description

core computations related to the geometry

4.4.2 Function/Subroutine Documentation

4.4.2.1 subroutine, public geometrymoduleovertopping::adjustnonhorizontalberms (type (tpgeometry), intent(in) *geometry,* type (tpgeometry), intent(out) *geometryFlatBerms,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

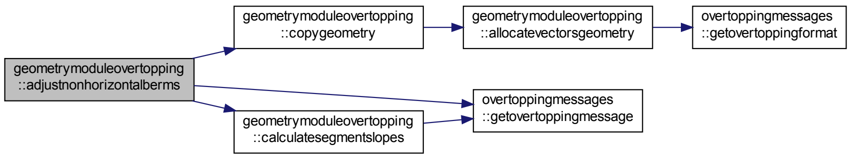
adjustNonHorizontalBerms: adjust non-horizontal berms

Parameters

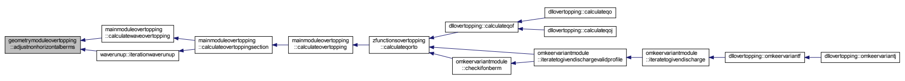
`in`	*geometry*	structure with geometry data
`out`	*geometryflat-berms*	geometry data with horizontal berms
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 571 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::allocatevectorsgeometry
overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::adjustnonhorizontalberms
overtoppingmessages ::getovertoppingmessage
geometrymoduleovertopping ::calculatesegmentslopes

Here is the caller graph for this function:


geometrymoduleovertopping ::adjustnonhorizontalberms
mainmoduleovertopping ::calculatewaveovertopping
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4.2.2 subroutine, public geometrymoduleovertopping::allocatevectorsgeometry (integer, intent(in) *nCoordinates,* type (tpgeometry), intent(inout) *geometry,* logical, intent(out) *succes,* character(len=∗), intent(inout) *errorMessage*)

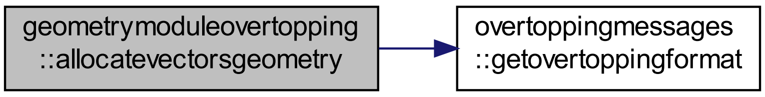
allocateVectorsGeometry: allocate the geometry vectors

Parameters

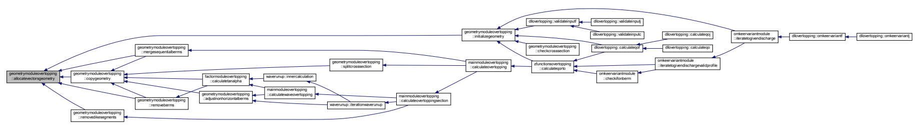
`in`	*ncoordinates*	number of coordinates
`in,out`	*geometry*	structure with geometry data
`out`	*succes*	succes flag
`in,out`	*errormessage*	error message (only set in case of error)

Definition at line 246 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::allocatevectorsgeometry
overtoppingmessages ::getovertoppingformat

Here is the caller graph for this function:


geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::mergesequentialberms
geometrymoduleovertopping ::removeberms
geometrymoduleovertopping ::removedikesegments
factormoduleovertopping ::calculatetanalpha
geometrymoduleovertopping ::adjustnonhorizontalberms
waverunup::innercalculation
mainmoduleovertopping ::calculatewaveovertopping
waverunup::iterationwaverunup
geometrymoduleovertopping ::splitcrosssection
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
geometrymoduleovertopping ::initializegeometry
dllovertopping::validateinputf
dllovertopping::validateinputj
dllovertopping::validateinputc
geometrymoduleovertopping ::checkcrosssection
dllovertopping::calculateqof
dllovertopping::calculateqoj
dllovertopping::calculateqo
zfunctionsovertopping ::calculateqorto
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4.2.3 subroutine, public geometrymoduleovertopping::basicgeometrytest (type(overtoppinggeometrytypef), intent(in) *geometryF,* logical, intent(out) *success,* type(terrormessages), intent(inout) *errorStruct*)

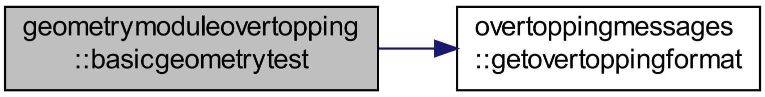
basicGeometryTest: test the input geometry (the adjusted geometry is checked elsewhere)

Parameters

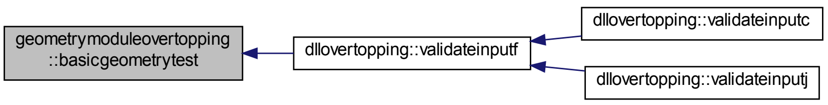
`in`	*geometryf*	struct with geometry and roughness
`in,out`	*errorstruct*	error message (only set if not successful)
`out`	*success*	success flag

Definition at line 1074 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::basicgeometrytest
overtoppingmessages ::getovertoppingformat

Here is the caller graph for this function:


geometrymoduleovertopping ::basicgeometrytest
dllovertopping::validateinputf
dllovertopping::validateinputc
dllovertopping::validateinputj

4.4.2.4 subroutine, public geometrymoduleovertopping::calculatehorzdistance (type (tpgeometry), intent(in) *geometry,* real(kind=wp), intent(in) *yLower,* real(kind=wp), intent(in) *yUpper,* real(kind=wp), intent(out) *dx,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

calculateHorzDistance: calculate horizontal distance

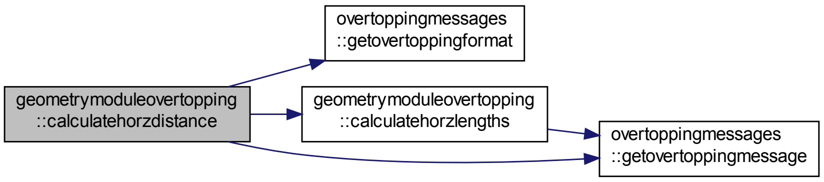
Parameters

`in`	*geometry*	structure with geometry data

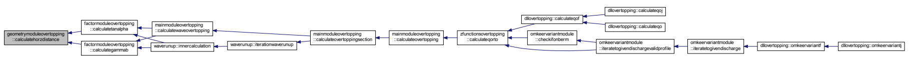
in	*ylower*	y-coordinate lower bound (m+NAP)
in	*yupper*	y-coordinate upper bound (m+NAP)
out	*dx*	horizontal distance between bounds (m)
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 1025 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::calculatehorzdistance
geometrymoduleovertopping ::calculatehorzlengths
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


geometrymoduleovertopping ::calculatehorzdistance
factormoduleovertopping ::calculatetanalpha
factormoduleovertopping ::calculategammab
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
dllovertopping::calculateqoj
dllovertopping::calculateqo
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4.2.5 subroutine, public geometrymoduleovertopping::calculatehorzlengths (type (tpgeometry), intent(in) *geometry,* real(kind=wp), intent(in) *yLower,* real(kind=wp), intent(in) *yUpper,* real(kind=wp), dimension(geometry%ncoordinates-1), intent(out) *horzLengths,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

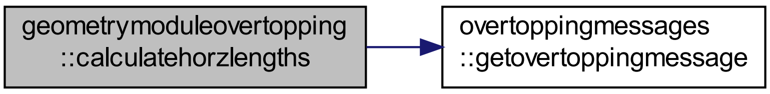
calculateHorzLengths: calculate horizontal lengths

Parameters

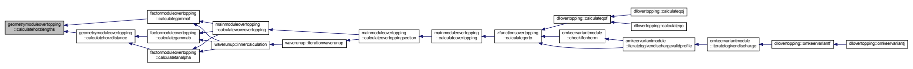
in	*geometry*	structure with geometry data
in	*ylower*	y-coord. lower bound (m+NAP)
in	*yupper*	y-coord. upper bound (m+NAP)
out	*horzlengths*	horizontal lengths segments (m)
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 929 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::calculatehorzlengths
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


geometrymoduleovertopping ::calculatehorzlengths
factormoduleovertopping ::calculategammaf
geometrymoduleovertopping ::calculatehorzdistance
factormoduleovertopping ::calculategammab
factormoduleovertopping ::calculatetanalpha
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
omkeervariantmodule ::checkifonberm
dllovertopping::calculateqoj
dllovertopping::calculateqo
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4.2.6 subroutine, public geometrymoduleovertopping::calculatesegmentslopes (type (tpgeometry), intent(inout) *geometry,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

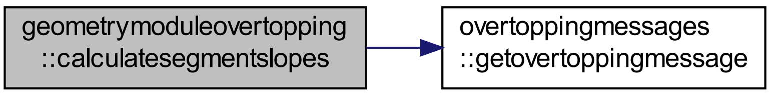
calculateSegmentSlopes: calculate the segment slopes

Parameters

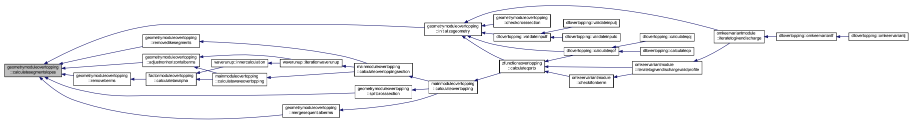
`in,out`	*geometry*	structure with geometry data
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 308 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::calculatesegmentslopes
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


geometrymoduleovertopping ::calculatesegmentslopes
geometrymoduleovertopping ::removedikesegments
geometrymoduleovertopping ::adjustnonhorizontalberms
geometrymoduleovertopping ::removeberms
factormoduleovertopping ::calculatetanalpha
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculatewaveovertopping
mainmoduleovertopping ::calculateovertoppingsection
geometrymoduleovertopping ::splitcrosssection
mainmoduleovertopping ::calculateovertopping
geometrymoduleovertopping ::mergesequentialberms
geometrymoduleovertopping ::initializegeometry
geometrymoduleovertopping ::checkcrosssection
dllovertopping::validateinputf
dllovertopping::validateinputj
dllovertopping::validateinputc
dllovertopping::calculateqof
dllovertopping::calculateqoj
dllovertopping::calculateqo
zfunctionsovertopping ::calculateqorto
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4.2.7 subroutine, public geometrymoduleovertopping::checkcrosssection (real(kind=wp), intent(in) *psi,* integer, intent(in) *nCoordinates,* real(kind=wp), dimension (ncoordinates), intent(in) *xCoordinates,* real(kind=wp), dimension (ncoordinates), intent(in) *yCoordinates,* real(kind=wp), dimension(ncoordinates-1), intent(in) *roughnessFactors,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

checkCrossSection: check cross section

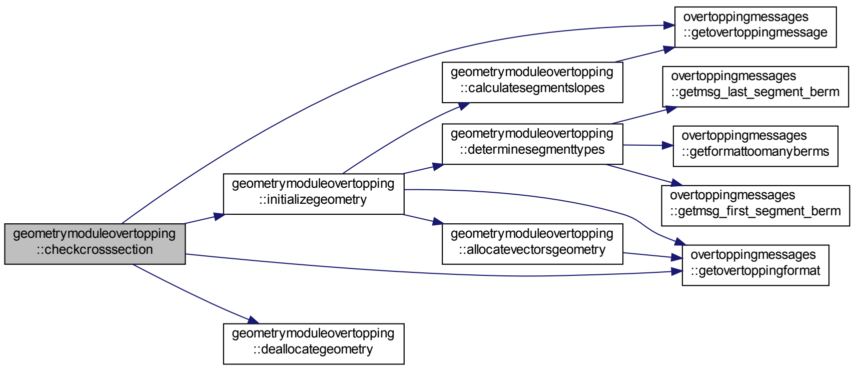
Parameters

`in`	*psi*	dike normal (degrees)
`in`	*ncoordinates*	number of coordinates
`in`	*xcoordinates*	x-coordinates (m)

`in`	*ycoordinates*	y-coordinates (m+NAP)
`in`	*roughnessfac-tors*	roughness factors
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 59 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


overtoppingmessages ::getovertoppingmessage
geometrymoduleovertopping ::calculatesegmentslopes
overtoppingmessages ::getmsg_last_segment_berm
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getformattoomanyberms
geometrymoduleovertopping ::initializegeometry
overtoppingmessages ::getmsg_first_segment_berm
geometrymoduleovertopping ::checkcrosssection
geometrymoduleovertopping ::allocatevectorsgeometry
overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::deallocategeometry

4.4.2.8 subroutine, public geometrymoduleovertopping::copygeometry (type (tpgeometry), intent(in) *geometry,* type (tpgeometry), intent(inout) *geometryCopy,* logical, intent(out) *succes,* character(len=∗), intent(inout) *errorMessage*)

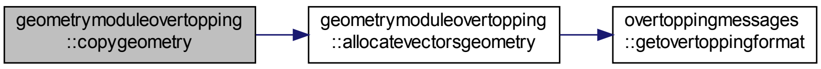
copyGeometry: copy a geometry structure

Parameters

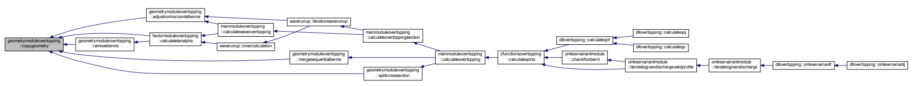
`in`	*geometry*	structure with geometry data
`in,out`	*geometrycopy*	structure with geometry data copy
`out`	*succes*	succes flag
`in,out`	*errormessage*	error message, only set in case of error

Definition at line 411 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::allocatevectorsgeometry
overtoppingmessages ::getovertoppingformat

Here is the caller graph for this function:


geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::adjustnonhorizontalberms
geometrymoduleovertopping ::removeberms
factormoduleovertopping ::calculatetanalpha
mainmoduleovertopping ::calculatewaveovertopping
waverunup::iterationwaverunup
waverunup::innercalculation
mainmoduleovertopping ::calculateovertoppingsection
geometrymoduleovertopping ::mergesequentialberms
geometrymoduleovertopping ::splitcrosssection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
omkeervariantmodule ::checkifonberm
dllovertopping::calculateqoj
dllovertopping::calculateqo
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4.2.9 subroutine, public geometrymoduleovertopping::deallocategeometry (type (tpgeometry), intent(inout) *geometry*)

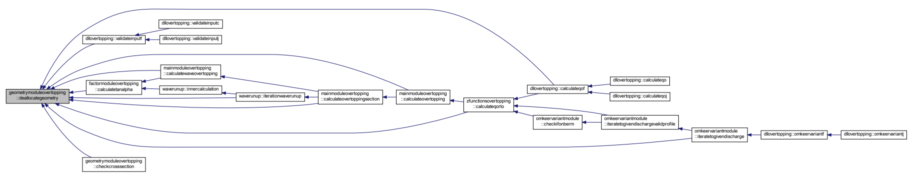
deallocateGeometry: deallocate the geometry vectors

Parameters

`in,out`	*geometry*	structure with geometry data

Definition at line 285 of file geometryModuleOvertopping.f90.

Here is the caller graph for this function:



geometrymoduleovertopping ::deallocategeometry
dllovertopping::validateinputc
dllovertopping::validateinputf
dllovertopping::validateinputj
mainmoduleovertopping ::calculatewaveovertopping
factormoduleovertopping ::calculatetanalpha
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj
geometrymoduleovertopping ::checkcrosssection

4.4.2.10 subroutine, public geometrymoduleovertopping::determinesegmenttypes (type (tpgeometry), intent(inout) *geometry,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

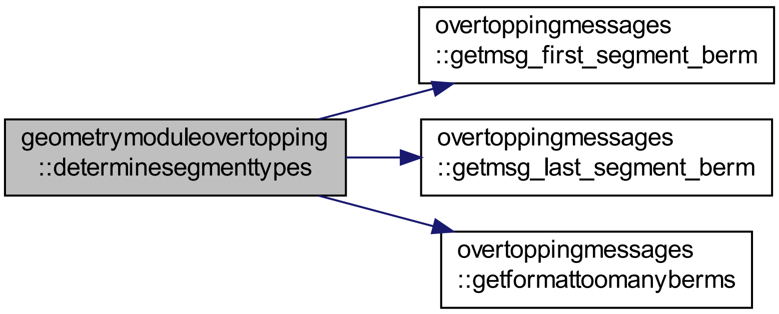
determineSegmentTypes: determine the segment types

Parameters

`in,out`	*geometry*	structure with geometry data
`out`	*succes*	success flag
`out`	*errormessage*	error message; only set in case of error

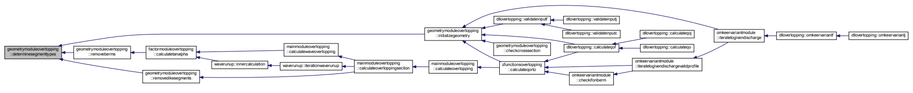
Definition at line 347 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:



geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_first_segment_berm
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms

Here is the caller graph for this function:



geometrymoduleovertopping ::determinesegmenttypes
geometrymoduleovertopping ::removeberms
factormoduleovertopping ::calculatetanalpha
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
geometrymoduleovertopping ::removedikesegments
geometrymoduleovertopping ::initializegeometry
dllovertopping::validateinputf
dllovertopping::validateinputj
dllovertopping::validateinputc
geometrymoduleovertopping ::checkcrosssection
dllovertopping::calculateqof
dllovertopping::calculateqoj
dllovertopping::calculateqo
zfunctionsovertopping ::calculateqorto
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4.2.11 subroutine, public geometrymoduleovertopping::initializegeometry (real(kind=wp), intent(in) *psi,* integer, intent(in) *nCoordinates,* real(kind=wp), dimension (ncoordinates), intent(in) *xCoordinates,* real(kind=wp), dimension (ncoordinates), intent(in) *yCoordinates,* real(kind=wp), dimension(ncoordinates-1), intent(in) *roughnessFactors,* type (tpgeometry), intent(out) *geometry,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

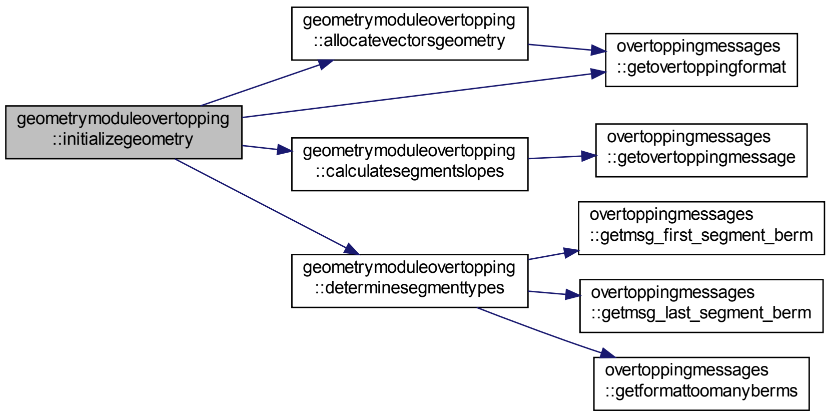
initializeGeometry: initialize the geometry

Parameters

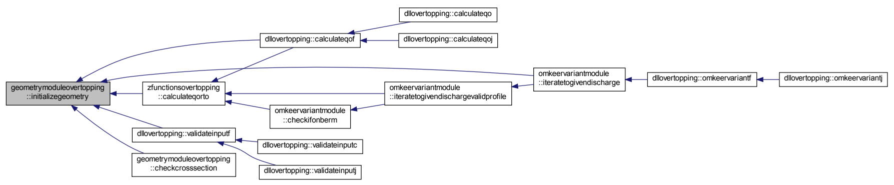
in	*psi*	dike normal (degree)
in	*ncoordinates*	number of coordinates
in	*xcoordinates*	x-coordinates (m)
in	*ycoordinates*	y-coordinates (m+NAP)
in	*roughnessfac-tors*	roughness factors
out	*geometry*	structure with geometry data
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 170 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::initializegeometry
geometrymoduleovertopping ::allocatevectorsgeometry
overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::calculatesegmentslopes
overtoppingmessages ::getovertoppingmessage
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_first_segment_berm
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms

Here is the caller graph for this function:


dllovertopping::calculateqo
dllovertopping::calculateqof
dllovertopping::calculateqoj
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj
geometrymoduleovertopping ::initializegeometry
zfunctionsovertopping ::calculateqorto
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::checkifonberm
dllovertopping::validateinputf
dllovertopping::validateinputc
geometrymoduleovertopping ::checkcrosssection
dllovertopping::validateinputj

4.4.2.12 subroutine, public geometrymoduleovertopping::mergesequentialberms (type (tpgeometry), intent(in) *geometry,* type (tpgeometry), intent(inout) *geometryMergedBerms,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

mergeSequentialBerms: merge sequential berms

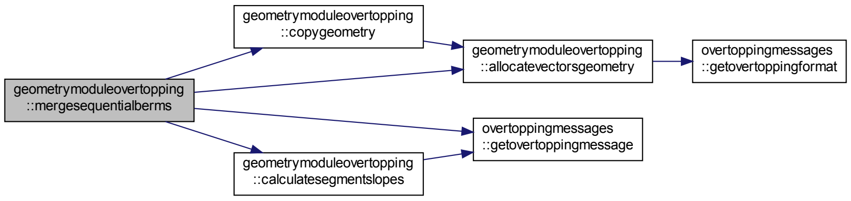
Parameters

in	*geometry*	structure with geometry data

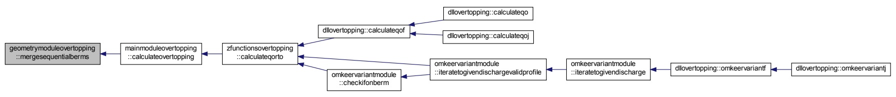
`in,out`	*geometrymergedberms*	geometry data with merged sequential berms
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 462 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::allocatevectorsgeometry
overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::mergesequentialberms
overtoppingmessages ::getovertoppingmessage
geometrymoduleovertopping ::calculatesegmentslopes

Here is the caller graph for this function:


dllovertopping::calculateqo
dllovertopping::calculateqof
dllovertopping::calculateqoj
geometrymoduleovertopping ::mergesequentialberms
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj
omkeervariantmodule ::checkifonberm

4.4.2.13 subroutine, public geometrymoduleovertopping::removeberms (type (tpgeometry), intent(in) *geometry,* type (tpgeometry), intent(out) *geometryNoBerms,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

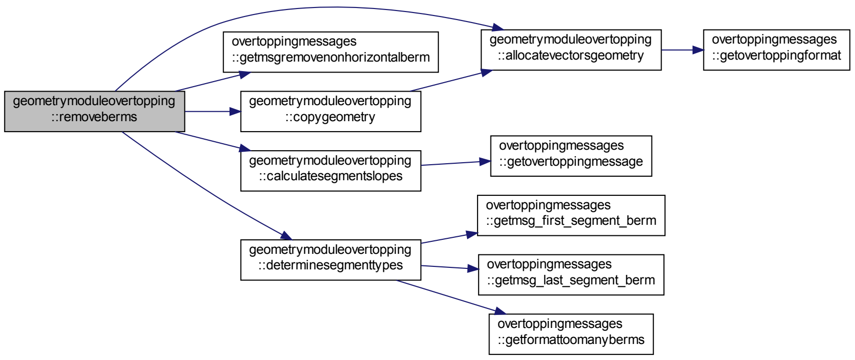
removeBerms: remove berms

Parameters

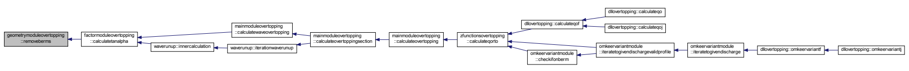
`in`	*geometry*	structure with geometry data
`out`	*geometrynoberms*	geometry data withouth berms
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 660 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


overtoppingmessages ::getmsgremovenonhorizontalberm
geometrymoduleovertopping ::allocatevectorsgeometry
overtoppingmessages ::getovertoppingformat
geometrymoduleovertopping ::removeberms
geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::calculatesegmentslopes
overtoppingmessages ::getovertoppingmessage
overtoppingmessages ::getmsg_first_segment_berm
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms

Here is the caller graph for this function:


geometrymoduleovertopping ::removeberms
factormoduleovertopping ::calculatetanalpha
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4.2.14 subroutine, public geometrymoduleovertopping::removedikesegments (type (tpgeometry), intent(in) *geometry,* integer, intent(in) *index,* type (tpgeometry), intent(out) *geometryAdjusted,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

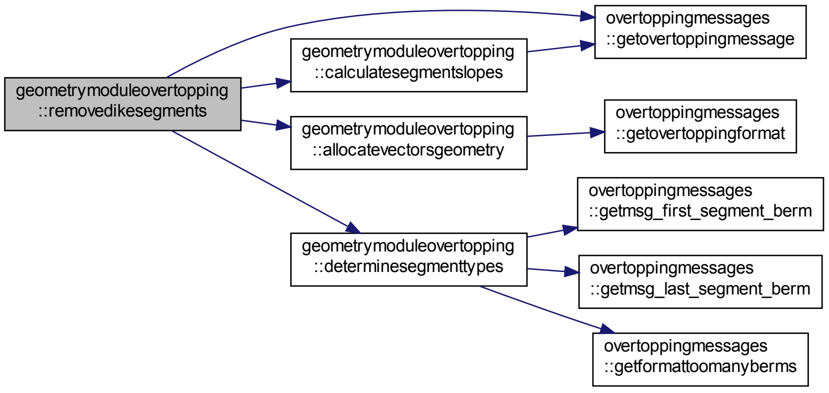
removeDikeSegments: remove dike segments

Parameters

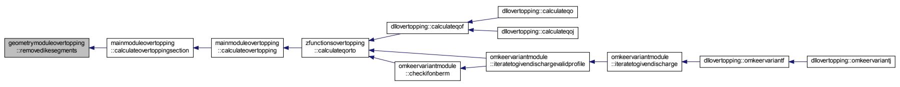
in	*geometry*	structure with geometry data
in	*index*	index starting point new cross section
out	*geometryad-justed*	geometry data with removed dike segments
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 760 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::removedikesegments
geometrymoduleovertopping ::calculatesegmentslopes
geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getovertoppingmessage
overtoppingmessages ::getovertoppingformat
overtoppingmessages ::getmsg_first_segment_berm
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms

Here is the caller graph for this function:


geometrymoduleovertopping ::removedikesegments
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.4.2.15 subroutine, public geometrymoduleovertopping::splitcrosssection (type (tpgeometry), intent(in) *geometry,* real(kind=wp), intent(in) *L0,* integer, intent(out) *NwideBerms,* type (tpgeometry), intent(out) *geometrysectionB,* type (tpgeometry), intent(out) *geometrysectionF,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

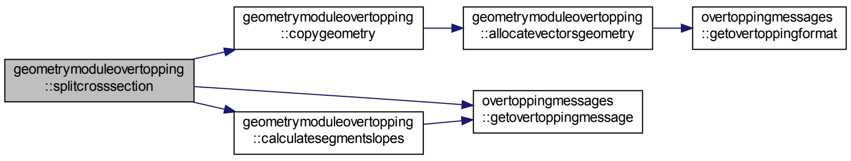
splitCrossSection: split a cross section

Parameters

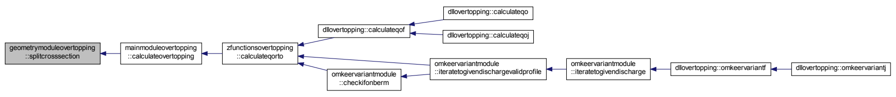
in	*geometry*	structure with geometry data
in	*l0*	wave length (m)
out	*nwideberms*	number of wide berms
out	*geometrysec-tionb*	geometry data with wide berms to ordinary berms
out	*geometrysec-tionf*	geometry data with wide berms to foreshores
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 824 of file geometryModuleOvertopping.f90.

Here is the call graph for this function:


geometrymoduleovertopping ::splitcrosssection
geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::allocatevectorsgeometry
overtoppingmessages ::getovertoppingformat
overtoppingmessages ::getovertoppingmessage
geometrymoduleovertopping ::calculatesegmentslopes

Here is the caller graph for this function:


geometrymoduleovertopping ::splitcrosssection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.5 mainmoduleovertopping Module Reference

core computations for Dikes Overtopping

Functions/Subroutines

- subroutine, public calculateovertopping (geometry, load, modelFactors, overtopping, logging, succes, error←Message)

  calculateOvertopping: calculate the overtopping
- subroutine, public calculateovertoppingsection (geometry, h, Hm0, Tm_10, L0, gammaBeta_z, gammaBeta←_o, modelFactors, overtopping, logging, succes, errorMessage)

  calculateOvertoppingSection: calculate the overtopping for a section
- subroutine, public calculatewaveovertopping (geometry, h, Hm0, Tm_10, z2, gammaBeta_o, modelFactors, Qo, succes, errorMessage)

  calculateWaveOvertopping: calculate wave overtopping
- subroutine calculateovertoppingnegativefreeboard (load, geometry, overtopping, succes, errorMessage)

  calculateOvertoppingNegativeFreeboard: calculate overtopping in case of negative freeboard
- subroutine, public interpolateresultssections (geometry, L0, NwideBerms, overtoppingB, overtoppingF, over-topping, succes, errorMessage)

  interpolateResultsSections: interpolate results for split cross sections
- subroutine, public checkinputdata (geometry, load, modelFactors, succes, errorMessage)

checkInputdata: check the input data

- subroutine, public checkmodelfactors (modelFactors, dimErrMessage, errorMessages, ierr)

  checkModelFactors: check the input data

4.5.1 Detailed Description

core computations for Dikes Overtopping

4.5.2 Function/Subroutine Documentation

4.5.2.1 subroutine, public mainmoduleovertopping::calculateovertopping (type (tpgeometry), intent(in) *geometry,* type (tpload), intent(in) *load,* type (tpovertoppinginput), intent(in) *modelFactors,* type (tpovertopping), intent(out) *overtopping,* type(tlogging), intent(in) *logging,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

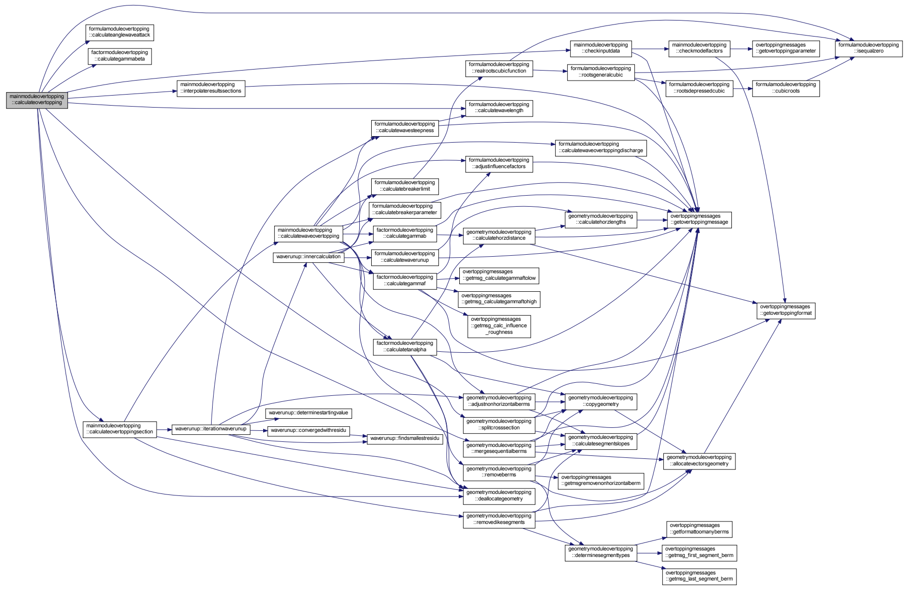
calculateOvertopping: calculate the overtopping

Parameters

`in`	*geometry*	structure with geometry data
`in`	*load*	structure with load parameters
`in`	*modelfactors*	structure with model factors
`out`	*overtopping*	structure with overtopping results
`in`	*logging*	logging struct
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

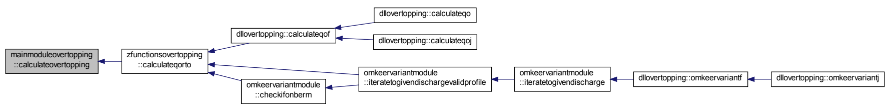
Definition at line 61 of file mainModuleOvertopping.f90.

Here is the call graph for this function:



mainmoduleovertopping ::calculateovertopping
formulamoduleovertopping ::calculateanglewaveattack
factormoduleovertopping ::calculategammabeta
mainmoduleovertopping ::interpolateresultssections
formulamoduleovertopping ::realrootscubicfunction
mainmoduleovertopping ::checkinputdata
mainmoduleovertopping ::checkmodelfactors
overtoppingmessages ::getovertoppingparameter
formulamoduleovertopping ::isequalzero
formulamoduleovertopping ::rootsgeneralcubic
formulamoduleovertopping ::rootsdepressedcubic
formulamoduleovertopping ::cubicroots
formulamoduleovertopping ::calculatewavelength
formulamoduleovertopping ::calculatewavesteepness
formulamoduleovertopping ::calculatewaveovertoppingdischarge
formulamoduleovertopping ::adjustinfluencefactors
formulamoduleovertopping ::calculatebreakerlimit
formulamoduleovertopping ::calculatebreakerparameter
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
factormoduleovertopping ::calculategammab
geometrymoduleovertopping ::calculatehorzdistance
geometrymoduleovertopping ::calculatehorzlengths
overtoppingmessages ::getovertoppingmessage
formulamoduleovertopping ::calculatewaverunup
factormoduleovertopping ::calculategammaf
overtoppingmessages ::getmsg_calculategammaftolow
overtoppingmessages ::getmsg_calculategammaftohigh
overtoppingmessages ::getmsg_calc_influence _roughness
overtoppingmessages ::getovertoppingformat
factormoduleovertopping ::calculatetanalpha
geometrymoduleovertopping ::adjustnonhorizontalberms
geometrymoduleovertopping ::copygeometry
waverunup::determinestartingvalue
mainmoduleovertopping ::calculateovertoppingsection
waverunup::iterationwaverunup
waverunup::convergedwithresidu
waverunup::findsmallestresidu
geometrymoduleovertopping ::splitcrosssection
geometrymoduleovertopping ::calculatesegmentslopes
geometrymoduleovertopping ::mergesequentialberms
geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::removeberms
overtoppingmessages ::getmsgremovenonhorizontalberm
geometrymoduleovertopping ::deallocategeometry
geometrymoduleovertopping ::removedikesegments
overtoppingmessages ::getformattoomanyberms
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_first_segment_berm
overtoppingmessages ::getmsg_last_segment_berm

Here is the caller graph for this function:


mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.5.2.2 subroutine mainmoduleovertopping::calculateovertoppingnegativefreeboard (type (tpload), intent(in) *load*, type (tpgeometry), intent(in) *geometry*, type (tpovertopping), intent(inout) *overtopping*, logical, intent(out) *succes*, character(len=∗), intent(out) *errorMessage*) `[private]`

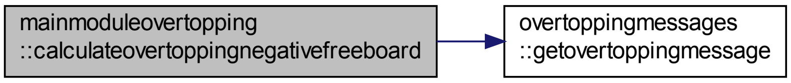
calculateOvertoppingNegativeFreeboard: calculate overtopping in case of negative freeboard

Parameters

`in`	*geometry*	structure with geometry data
`in`	*load*	structure with load parameters
`in,out`	*overtopping*	structure with overtopping results
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 505 of file mainModuleOvertopping.f90.

Here is the call graph for this function:


mainmoduleovertopping ::calculateovertoppingnegativefreeboard
overtoppingmessages ::getovertoppingmessage

4.5.2.3 subroutine, public mainmoduleovertopping::calculateovertoppingsection (type (tpgeometry), intent(in) *geometry*, real(kind=wp), intent(in) *h*, real(kind=wp), intent(in) *Hm0*, real(kind=wp), intent(in) *Tm_10*, real(kind=wp), intent(in) *L0*, real(kind=wp), intent(inout) *gammaBeta_z*, real(kind=wp), intent(inout) *gammaBeta_o*, type (tpovertoppinginput), intent(in) *modelFactors*, type (tpovertopping), intent(out) *overtopping*, type(tlogging), intent(in) *logging*, logical, intent(out) *succes*, character(len=∗), intent(out) *errorMessage*)

calculateOvertoppingSection: calculate the overtopping for a section

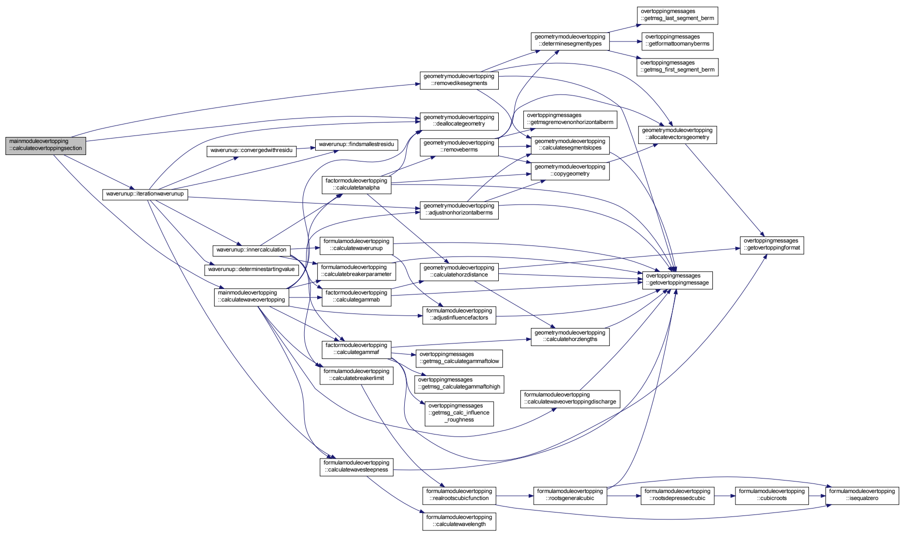
Parameters

`in`	*geometry*	structure with geometry data
`in`	*h*	local water level (m+NAP)
`in`	*hm0*	significant wave height (m)
`in`	*tm_10*	spectral wave period (s)
`in`	*l0*	wave length (m)
`in,out`	*gammabeta_z*	influence angle wave attack wave run-up

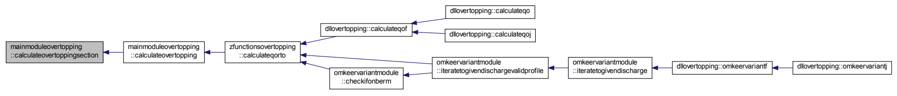
in,out	*gammabeta_o*	influence angle wave attack overtopping
in	*modelfactors*	structure with model factors
out	*overtopping*	structure with overtopping results
in	*logging*	logging struct
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 191 of file mainModuleOvertopping.f90.

Here is the call graph for this function:



Here is the caller graph for this function:


mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqrto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.5.2.4 subroutine, public mainmoduleovertopping::calculatewaveovertopping (type (tpgeometry), intent(in) *geometry,* real(kind=wp), intent(in) *h,* real(kind=wp), intent(in) *Hm0,* real(kind=wp), intent(in) *Tm_10,* real(kind=wp), intent(in) *z2,* real(kind=wp), intent(inout) *gammaBeta_o,* type (tpovertoppinginput), intent(in) *modelFactors,* real(kind=wp), intent(out) *Qo,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

calculateWaveOvertopping: calculate wave overtopping

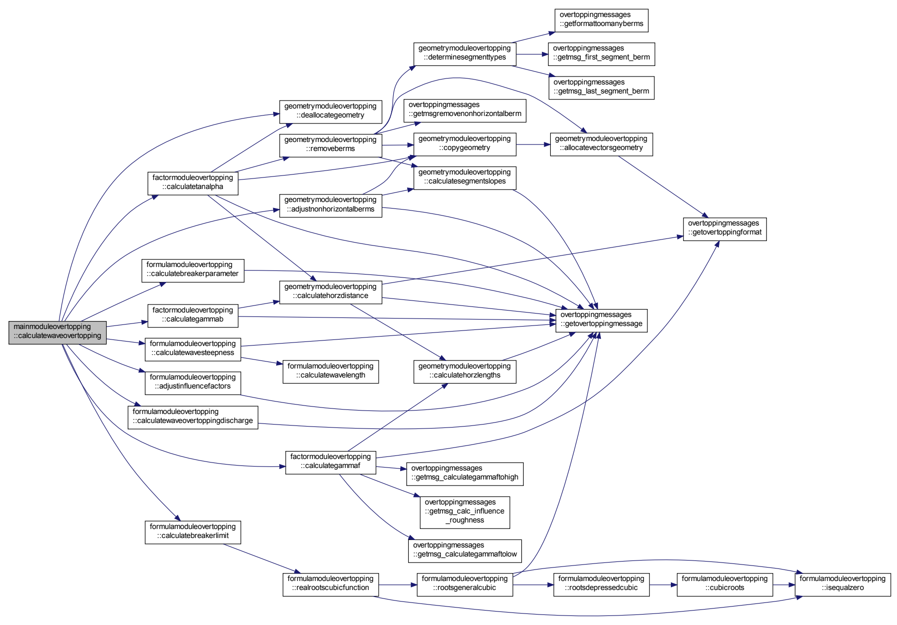
Parameters

in	*geometry*	structure with geometry data
in	*h*	local water level (m+NAP)
in	*hm0*	significant wave height (m)
in	*tm_10*	spectral wave period (s)
in	*z2*	2% wave run-up (m)

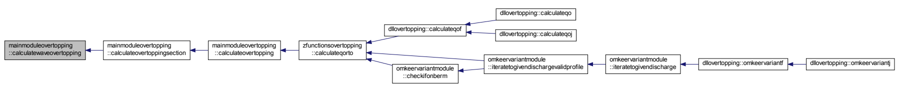
in,out	*gammabeta_o*	influence angle wave attack overtopping
in	*modelfactors*	structure with model factors
out	*qo*	wave overtopping discharge (m3/m per s)
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 418 of file mainModuleOvertopping.f90.

Here is the call graph for this function:


mainmoduleovertopping ::calculatewaveovertopping
factormoduleovertopping ::calculatetanalpha
geometrymoduleovertopping ::deallocategeometry
geometrymoduleovertopping ::removeberms
geometrymoduleovertopping ::adjustnonhorizontalberms
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getformattoomanyberms
overtoppingmessages ::getmsg_first_segment_berm
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getmsgremovenonhorizontalberm
geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::calculatesegmentslopes
overtoppingmessages ::getovertoppingformat
formulamoduleovertopping ::calculatebreakerparameter
geometrymoduleovertopping ::calculatehorzdistance
factormoduleovertopping ::calculategammab
overtoppingmessages ::getovertoppingmessage
formulamoduleovertopping ::calculatewavesteepness
formulamoduleovertopping ::calculatewavelength
geometrymoduleovertopping ::calculatehorzlengths
formulamoduleovertopping ::adjustinfluencefactors
formulamoduleovertopping ::calculatewaveovertoppingdischarge
factormoduleovertopping ::calculategammaf
overtoppingmessages ::getmsg_calculategammaftohigh
overtoppingmessages ::getmsg_calc_influence _roughness
overtoppingmessages ::getmsg_calculategammaftolow
formulamoduleovertopping ::calculatebreakerlimit
formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::rootsgeneralcubic
formulamoduleovertopping ::rootsdepressedcubic
formulamoduleovertopping ::cubicroots
formulamoduleovertopping ::isequalzero

Here is the caller graph for this function:


mainmoduleovertopping ::calculatewaveovertopping
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.5.2.5 subroutine, public mainmoduleovertopping::checkinputdata (type (tpgeometry), intent(in) *geometry,* type (tpload), intent(in) *load,* type (tpovertoppinginput), intent(in) *modelFactors,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

checkInputdata: check the input data

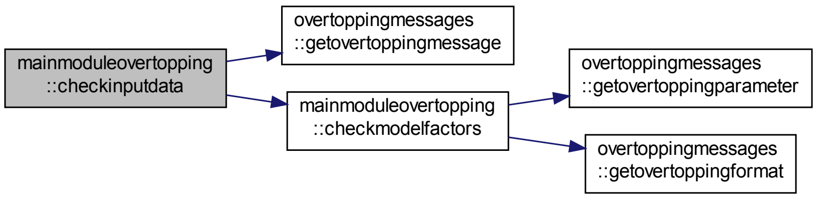
Parameters

in	*geometry*	structure with geometry data
in	*load*	structure with load parameters
in	*modelfactors*	structure with model factors
out	*succes*	flag for succes

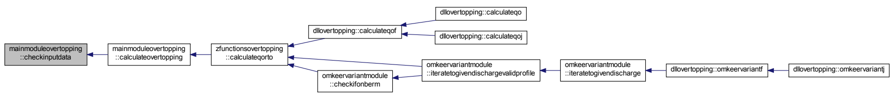
out	*errormessage*	error message

Definition at line 622 of file mainModuleOvertopping.f90.

Here is the call graph for this function:


mainmoduleovertopping ::checkinputdata
overtoppingmessages ::getovertoppingmessage
mainmoduleovertopping ::checkmodelfactors
overtoppingmessages ::getovertoppingparameter
overtoppingmessages ::getovertoppingformat

Here is the caller graph for this function:


mainmoduleovertopping ::checkinputdata
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.5.2.6 subroutine, public mainmoduleovertopping::checkmodelfactors (type (tpovertoppinginput), intent(in) *modelFactors,* integer, intent(in) *dimErrMessage,* character(len=∗), dimension(dimerrmessage), intent(out) *errorMessages,* integer, intent(out) *ierr*)

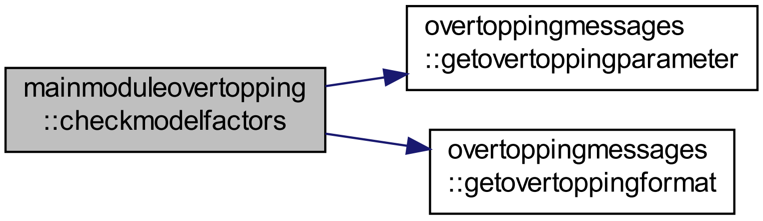
checkModelFactors: check the input data

Parameters

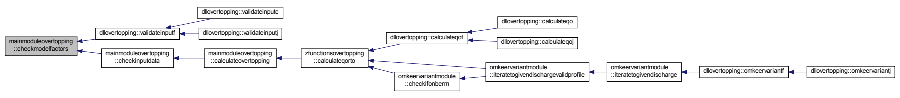
in	*modelfactors*	structure with model factors
in	*dimerrmessage*	max. number of error messages
out	*ierr*	number of errors found
out	*errormessages*	error message

Definition at line 684 of file mainModuleOvertopping.f90.

Here is the call graph for this function:


mainmoduleovertopping ::checkmodelfactors
overtoppingmessages ::getovertoppingparameter
overtoppingmessages ::getovertoppingformat

Here is the caller graph for this function:


mainmoduleovertopping ::checkmodelfactors
dllovertopping::validateinputf
dllovertopping::validateinputc
dllovertopping::validateinputj
mainmoduleovertopping ::checkinputdata
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.5.2.7 subroutine, public mainmoduleovertopping::interpolateresultssections (type (tpgeometry), intent(in) *geometry,* real(kind=wp), intent(in) *L0,* integer, intent(in) *NwideBerms,* type (tpovertopping), intent(in) *overtoppingB,* type (tpovertopping), intent(in) *overtoppingF,* type (tpovertopping), intent(out) *overtopping,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

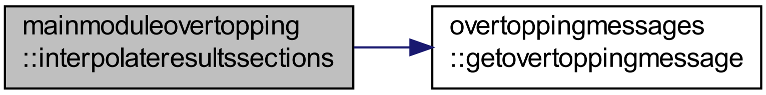
interpolateResultsSections: interpolate results for split cross sections

Parameters

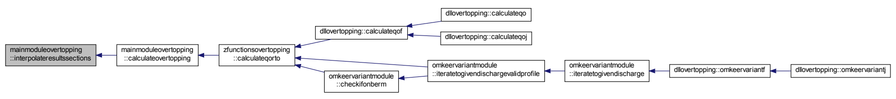
in	*geometry*	structure with geometry data
in	*l0*	wave length (m)
in	*nwideberms*	number of wide berms
in	*overtoppingb*	structure with overtopping results ordinary berms
in	*overtoppingf*	structure with overtopping results foreshores
out	*overtopping*	structure with combined overtopping results
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 541 of file mainModuleOvertopping.f90.

Here is the call graph for this function:


mainmoduleovertopping ::interpolateresultssections
overtoppingmessages ::getovertoppingmessage

Here is the caller graph for this function:


mainmoduleovertopping ::interpolateresultssections
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.6 modulelogging Module Reference

steering the extra logging

Data Types

- type tlogging

  TLogging: structure for steering the logging.

Variables

- integer, parameter maxfilenamelength = 256

  maximum length of filename

4.6.1 Detailed Description

steering the extra logging

4.6.2 Variable Documentation

4.6.2.1 integer, parameter modulelogging::maxfilenamelength = 256

maximum length of filename

Definition at line 35 of file ModuleLogging.f90.

4.7 omkeervariantmodule Module Reference

Module for the 'omkeerVariant'.

Data Types

- type tomkeer

Functions/Subroutines

- subroutine, public iteratetogivendischarge (load, geometryF, givenDischarge, dikeHeight, modelFactors, over-topping, success, errorText, logging)

  Subroutine with omkeerVariant.
- subroutine iteratetogivendischargevalidprofile (load, geometry, givenDischarge, dikeHeight, modelFactors, overtopping, logging, success, errorText)

  Subroutine with iterateToGivenDischarge, with already checked profile.
- subroutine checkifonberm (geometry, load, modelfactors, overtopping, givenDischarge, dikeHeight, omkeer↩ Props, logging, iUp, iLow, dis1, dis2, minDikeHeight, maxDikeHeight, foundValue, success, errorText)

Variables

- real(kind=wp), parameter toldischarge = 1d-3
- real(kind=wp), parameter toldikeheight = 1d-3
- real(kind=wp), parameter minzberm = 0.1_wp

4.7.1 Detailed Description

Module for the 'omkeerVariant'.

4.7.2 Function/Subroutine Documentation

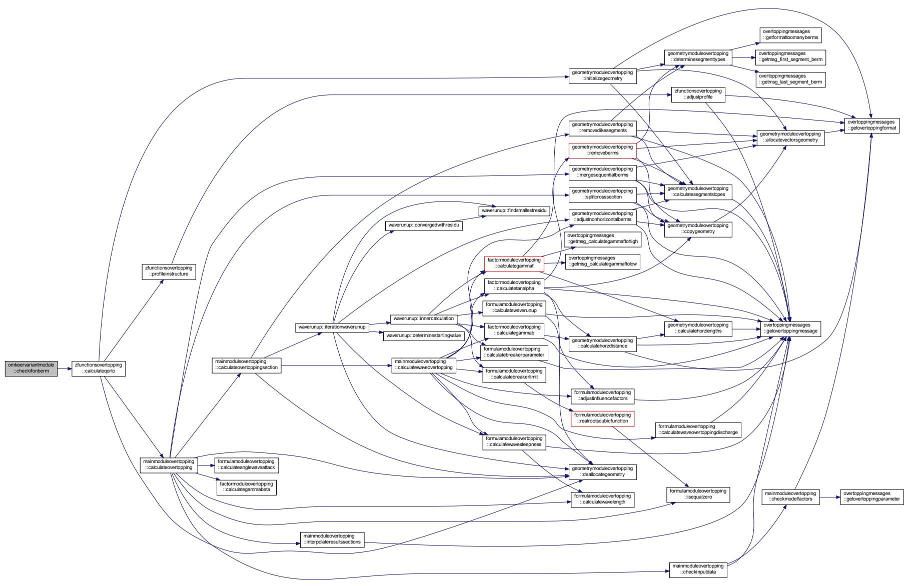
4.7.2.1 subroutine omkeervariantmodule::checkifonberm (type(tpgeometry), intent(in) *geometry,* type(tpload), intent(in) *load,* type(tpovertoppinginput), intent(inout) *modelfactors,* type(tpovertopping), intent(inout) *overtopping,* real(kind=wp), intent(in) *givenDischarge,* real(kind=wp), intent(inout) *dikeHeight,* type(tomkeer), intent(inout) *omkeerProps,* type(tlogging), intent(in) *logging,* integer, intent(in) *iUp,* integer, intent(in) *iLow,* real(kind=wp), intent(inout) *dis1,* real(kind=wp), intent(inout) *dis2,* real(kind=wp), intent(inout) *minDikeHeight,* real(kind=wp), intent(inout) *maxDikeHeight,* logical, intent(inout) *foundValue,* logical, intent(inout) *success,* character(len=∗), intent(inout) *errorText*)

Parameters

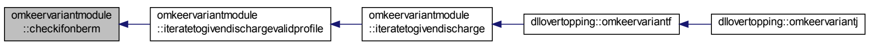
`in`	*geometry*	internal structure with geometry data
`in`	*load*	struct with waterlevel and wave parameters
`in,out`	*modelfactors*	struct with modelFactors
`in,out`	*overtopping*	structure with overtopping results
`in,out`	*omkeerprops*	struct with derived properties
`in`	*logging*	logging struct
`in`	*iup*	upper bound on profile
`in`	*ilow*	lower bound on profile
`in`	*givendischarge*	discharge to iterate to
`in,out`	*dis1*	discharge at minDikeHeight
`in,out`	*dis2*	discharge at maxDikeHeight
`in,out`	*mindikeheight*	lower bound dike heigth
`in,out`	*maxdikeheight*	upper bound dike heigth
`in,out`	*dikeheight*	dike height
`in,out`	*foundvalue*	flag for early succesfull return
`in,out`	*success*	flag for success
`in,out`	*errortext*	error message (only set if not successful)

Definition at line 248 of file omkeerVariantModule.f90.

Here is the call graph for this function:



Here is the caller graph for this function:


omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.7.2.2 subroutine, public omkeervariantmodule::iteratetogivendischarge (type(tpload), intent(in) *load,* type(overtoppinggeometrytypef), intent(in) *geometryF,* real(kind=wp), intent(in) *givenDischarge,* real(kind=wp), intent(out) *dikeHeight,* type(tpovertoppinginput), intent(inout) *modelFactors,* type (tpovertopping), intent(inout) *overtopping,* logical, intent(out) *success,* character(len=∗), intent(out) *errorText,* type(tlogging), intent(in) *logging*)

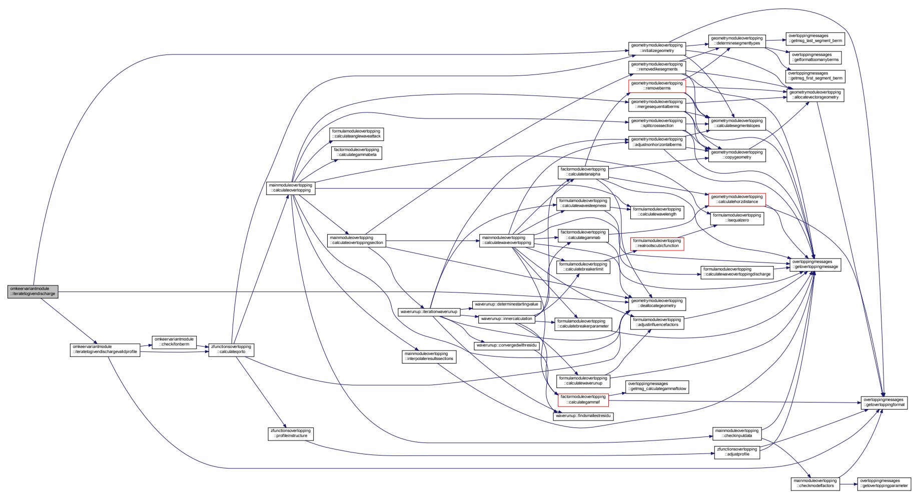
Subroutine with omkeerVariant.

Parameters

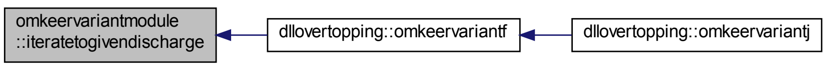
in	*geometryf*	struct with geometry and roughness
in	*load*	struct with waterlevel and wave parameters
in	*givendischarge*	discharge to iterate to
out	*dikeheight*	dike height
in,out	*modelfactors*	struct with modelFactors
in,out	*overtopping*	structure with overtopping results
out	*success*	flag for success
out	*errortext*	error message (only set if not successful)
in	*logging*	logging struct

Definition at line 63 of file omkeerVariantModule.f90.

Here is the call graph for this function:


omkeervariantmodule ::iteratetogivendischarge
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::checkifonberm
zfunctionsovertopping ::calculateqorto
zfunctionsovertopping ::profileinstructure
mainmoduleovertopping ::calculateovertopping
formulamoduleovertopping ::calculateanglewaveattack
factormoduleovertopping ::calculategammabeta
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculatewaveovertopping
waverunup::iterationwaverunup
waverunup::determinestartingvalue
waverunup::innercalculation
waverunup::convergedwithresidu
waverunup::findsmallestresidu
mainmoduleovertopping ::interpolateresultssections
geometrymoduleovertopping ::initializegeometry
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms
overtoppingmessages ::getmsg_first_segment_berm
geometrymoduleovertopping ::removedikesegments
geometrymoduleovertopping ::removeberms
geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::mergesequentialberms
geometrymoduleovertopping ::splitcrosssection
geometrymoduleovertopping ::calculatesegmentslopes
geometrymoduleovertopping ::adjustnonhorizontalberms
geometrymoduleovertopping ::copygeometry
factormoduleovertopping ::calculatetanalpha
geometrymoduleovertopping ::calculatehorzdistance
formulamoduleovertopping ::calculatewavesteepness
formulamoduleovertopping ::calculatewavelength
formulamoduleovertopping ::isequalzero
factormoduleovertopping ::calculategammab
formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::calculatebreakerlimit
overtoppingmessages ::getovertoppingmessage
formulamoduleovertopping ::calculatewaveovertoppingdischarge
geometrymoduleovertopping ::deallocategeometry
formulamoduleovertopping ::calculatebreakerparameter
formulamoduleovertopping ::adjustinfluencefactors
formulamoduleovertopping ::calculatewaverunup
overtoppingmessages ::getmsg_calculategammaftolow
factormoduleovertopping ::calculategammaf
overtoppingmessages ::getovertoppingformat
mainmoduleovertopping ::checkinputdata
zfunctionsovertopping ::adjustprofile
mainmoduleovertopping ::checkmodelfactors
overtoppingmessages ::getovertoppingparameter

Here is the caller graph for this function:


omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.7.2.3 subroutine omkeervariantmodule::iteratetogivendischargevalidprofile (type(tpload), intent(in) *load,* type(tpgeometry), intent(in) *geometry,* real(kind=wp), intent(in) *givenDischarge,* real(kind=wp), intent(out) *dikeHeight,* type(tpovertoppinginput), intent(inout) *modelFactors,* type (tpovertopping), intent(inout) *overtopping,* type(tlogging), intent(in) *logging,* logical, intent(out) *success,* character(len=∗), intent(out) *errorText*) [private]

Subroutine with iterateToGivenDischarge, with already checked profile.

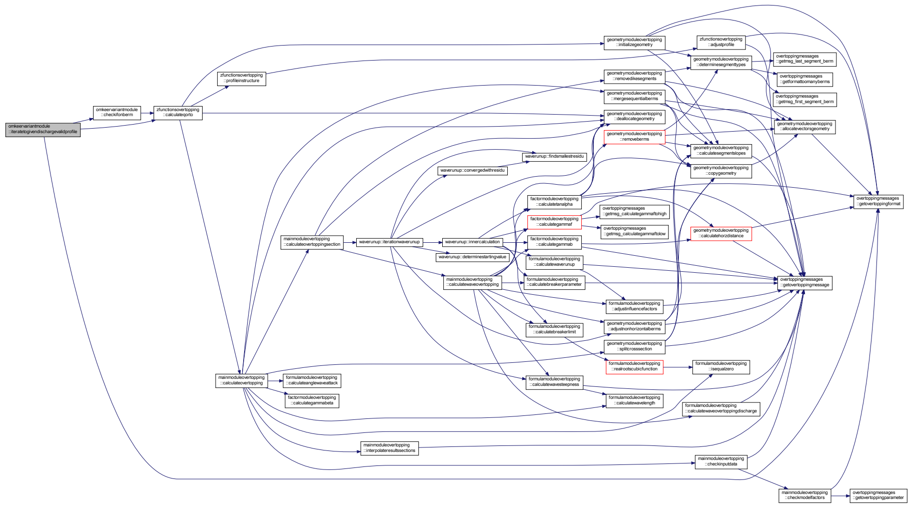
Parameters

in	*geometry*	internal structure with geometry data

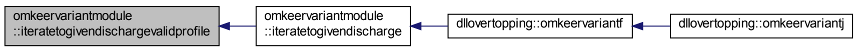
`in`	*load*	struct with waterlevel and wave parameters
`in`	*givendischarge*	discharge to iterate to
`out`	*dikeheight*	dike height
`in,out`	*modelfactors*	struct with modelFactors
`in,out`	*overtopping*	structure with overtopping results
`in`	*logging*	logging struct
`out`	*success*	flag for success
`out`	*errortext*	error message (only set if not successful)

Definition at line 102 of file omkeerVariantModule.f90.

Here is the call graph for this function:


omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::checkifonberm
zfunctionsovertopping ::calculateqorto
zfunctionsovertopping ::profileinstructure
mainmoduleovertopping ::calculateovertoppingsection
waverunup::iterationwaverunup
waverunup::innercalculation
waverunup::determinestartingvalue
waverunup::convergedwithresidu
waverunup::findsmallestresidu
mainmoduleovertopping ::calculatewaveovertopping
mainmoduleovertopping ::calculateovertopping
formulamoduleovertopping ::calculateanglewaveattack
factormoduleovertopping ::calculategammabeta
mainmoduleovertopping ::interpolateresultssections
geometrymoduleovertopping ::initializegeometry
zfunctionsovertopping ::adjustprofile
geometrymoduleovertopping ::determinesegmenttypes
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms
overtoppingmessages ::getmsg_first_segment_berm
geometrymoduleovertopping ::removedikesegments
geometrymoduleovertopping ::mergesequentialberms
geometrymoduleovertopping ::deallocategeometry
geometrymoduleovertopping ::removeberms
geometrymoduleovertopping ::allocatevectorsgeometry
geometrymoduleovertopping ::calculatesegmentslopes
geometrymoduleovertopping ::copygeometry
factormoduleovertopping ::calculatetanalpha
factormoduleovertopping ::calculategammaf
overtoppingmessages ::getmsg_calculategammaftohigh
overtoppingmessages ::getmsg_calculategammaftolow
factormoduleovertopping ::calculategammab
geometrymoduleovertopping ::calculatehorzdistance
overtoppingmessages ::getovertoppingformat
formulamoduleovertopping ::calculatewaverunup
formulamoduleovertopping ::calculatebreakerparameter
overtoppingmessages ::getovertoppingmessage
formulamoduleovertopping ::adjustinfluencefactors
geometrymoduleovertopping ::adjustnonhorizontalberms
formulamoduleovertopping ::calculatebreakerlimit
geometrymoduleovertopping ::splitcrosssection
formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::isequalzero
formulamoduleovertopping ::calculatewavesteepness
formulamoduleovertopping ::calculatewavelength
formulamoduleovertopping ::calculatewaveovertoppingdischarge
mainmoduleovertopping ::checkinputdata
mainmoduleovertopping ::checkmodelfactors
overtoppingmessages ::getovertoppingparameter

Here is the caller graph for this function:


omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.7.3 Variable Documentation

4.7.3.1 real(kind=wp), parameter omkeervariantmodule::minzberm = 0.1_wp

Definition at line 46 of file omkeerVariantModule.f90.

4.7.3.2 real(kind=wp), parameter omkeervariantmodule::toldikeheight = 1d-3

Definition at line 45 of file omkeerVariantModule.f90.

4.7.3.3 real(kind=wp), parameter omkeervariantmodule::toldischarge = 1d-3

Definition at line 44 of file omkeerVariantModule.f90.

4.8 overtoppinginterface Module Reference

Module for the interface of dllOvertopping.

Data Types

- type overtoppinggeometrytype
- type overtoppinggeometrytypef
- type tpprofilecoordinate

Variables

- integer, parameter, public varmodelfactorcriticalovertopping = 8

    Model factor critical overtopping.

4.8.1 Detailed Description

Module for the interface of dllOvertopping.

4.8.2 Variable Documentation

4.8.2.1 integer, parameter, public overtoppinginterface::varmodelfactorcriticalovertopping = 8

Model factor critical overtopping.

Definition at line 38 of file overtoppingInterface.f90.

4.9 overtoppingmessages Module Reference

Module for the messages in the overtopping dll, in Dutch or English.

Functions/Subroutines

- subroutine setlanguage (lang)

    IDs for the strings in this module:
- subroutine getlanguage (lang)

    Subroutine that gets the language for error and validation messages.
- character(len=maxmsg) function getovertoppingmessage (ID)

    Subroutine that returns a message with the corresponding ID in the current language.
- character(len=maxmsg) function getovertoppingformat (ID)

    Subroutine that returns a Fortran format string with the corresponding ID in the current language.
- character(len=maxpar) function getovertoppingparameter (ID)

    Subroutine that returns the name of an input parameter with the corresponding ID in the current language.
- subroutine getmsg_calculategammaftolow (message)
- subroutine getmsg_calculategammaftohigh (message)
- subroutine getmsg_calc_influence_roughness (message)
- subroutine getmsg_first_segment_berm (message)
- subroutine getmsg_last_segment_berm (message)
- subroutine getformattoomanyberms (cfmt)
- subroutine getmsgremovenonhorizontalberm (message)

Variables

- integer, parameter, private maxmsg = 128
- integer, parameter, private maxpar =32
- character(len=2), private language = 'NL'

    default : Dutch

4.9.1 Detailed Description

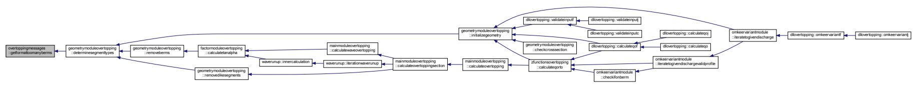
Module for the messages in the overtopping dll, in Dutch or English.

4.9.2 Function/Subroutine Documentation

4.9.2.1 subroutine overtoppingmessages::getformattoomanyberms (character(len=∗), intent(out) *cfmt*)

Definition at line 413 of file OvertoppingMessages.f90.

Here is the caller graph for this function:


overtoppingmessages ::getformattoomanyberms
geometrymoduleovertopping ::determinesegmenttypes
geometrymoduleovertopping ::removeberms
factormoduleovertopping ::calculatetanalpha
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
geometrymoduleovertopping ::removedikesegments
mainmoduleovertopping ::calculateovertopping
geometrymoduleovertopping ::initializegeometry
zfunctionsovertopping ::calculateqorto
dllovertopping::validateinputf
dllovertopping::validateinputj
dllovertopping::validateinputc
geometrymoduleovertopping ::checkcrosssection
dllovertopping::calculateqof
dllovertopping::calculateqoj
dllovertopping::calculateqo
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.9.2.2 subroutine overtoppingmessages::getlanguage (character(len=∗), intent(out) *lang*)

Subroutine that gets the language for error and validation messages.

Parameters

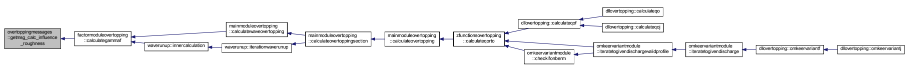
out	*lang*	filled with current language ID

Definition at line 119 of file OvertoppingMessages.f90.

4.9.2.3 subroutine overtoppingmessages::getmsg_calc_influence_roughness (character(len=∗), intent(out) *message*)

Definition at line 386 of file OvertoppingMessages.f90.

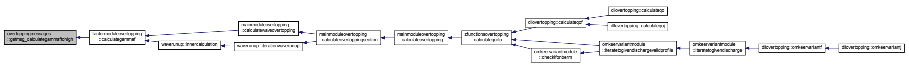
Here is the caller graph for this function:


overtoppingmessages ::getmsg_calc_influence _roughness
factormoduleovertopping ::calculategammaf
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.9.2.4 subroutine overtoppingmessages::getmsg_calculategammaftohigh (character(len=∗), intent(out) *message*)

Definition at line 377 of file OvertoppingMessages.f90.

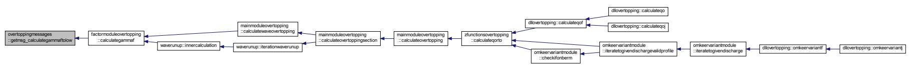
Here is the caller graph for this function:


overtoppingmessages ::getmsg_calculategammaftohigh
factormoduleovertopping ::calculategammaf
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.9.2.5 subroutine overtoppingmessages::getmsg_calculategammaftolow (character(len=∗), intent(out) *message*)

Definition at line 368 of file OvertoppingMessages.f90.

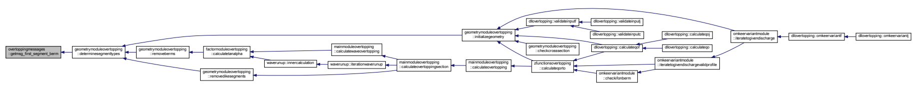
Here is the caller graph for this function:


overtoppingmessages ::getmsg_calculategammaftolow
factormoduleovertopping ::calculategammaf
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.9.2.6 subroutine overtoppingmessages::getmsg_first_segment_berm (character(len=∗), intent(out) *message*)

Definition at line 395 of file OvertoppingMessages.f90.

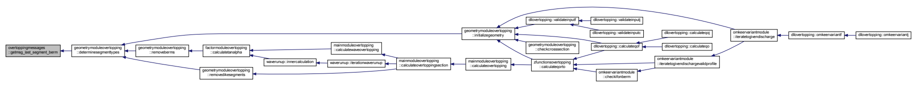
Here is the caller graph for this function:


overtoppingmessages ::getmsg_first_segment_berm
geometrymoduleovertopping ::determinesegmenttypes
geometrymoduleovertopping ::removeberms
factormoduleovertopping ::calculatetanalpha
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
geometrymoduleovertopping ::removedikesegments
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
geometrymoduleovertopping ::initializegeometry
dllovertopping::validateinputf
dllovertopping::validateinputj
dllovertopping::validateinputc
geometrymoduleovertopping ::checkcrosssection
dllovertopping::calculateqof
dllovertopping::calculateqoj
dllovertopping::calculateqo
zfunctionsovertopping ::calculateqorto
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.9.2.7 subroutine overtoppingmessages::getmsg_last_segment_berm (character(len=∗), intent(out) *message*)

Definition at line 404 of file OvertoppingMessages.f90.

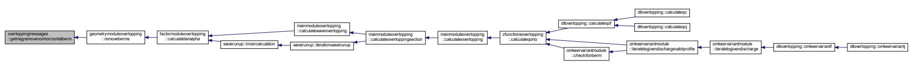
Here is the caller graph for this function:


overtoppingmessages ::getmsg_last_segment_berm
geometrymoduleovertopping ::determinesegmenttypes
geometrymoduleovertopping ::removeberms
factormoduleovertopping ::calculatetanalpha
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
geometrymoduleovertopping ::removedikesegments
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
geometrymoduleovertopping ::initializegeometry
dllovertopping::validateinputf
dllovertopping::validateinputj
dllovertopping::validateinputc
geometrymoduleovertopping ::checkcrosssection
dllovertopping::calculateqof
dllovertopping::calculateqoj
dllovertopping::calculateqo
zfunctionsovertopping ::calculateqorto
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.9.2.8 subroutine overtoppingmessages::getmsgremovenonhorizontalberm (character(len=∗), intent(out) *message*)

Definition at line 422 of file OvertoppingMessages.f90.

Here is the caller graph for this function:


overtoppingmessages ::getmsgremovenonhorizontalberm
geometrymoduleovertopping ::removeberms
factormoduleovertopping ::calculatetanalpha
mainmoduleovertopping ::calculatewaveovertopping
waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.9.2.9 character(len=maxmsg) function overtoppingmessages::getovertoppingformat (integer, intent(in) *ID*)

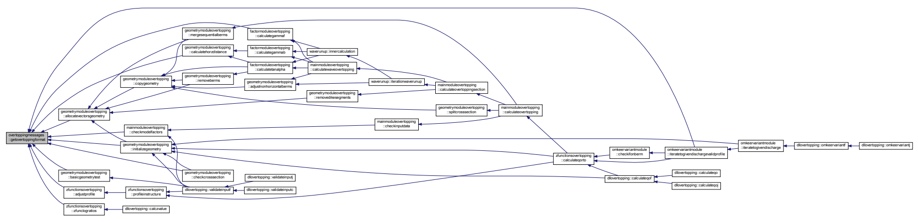
Subroutine that returns a Fortran format string with the corresponding ID in the current language.

Parameters

in	*id*	identification number of string

Definition at line 271 of file OvertoppingMessages.f90.

Here is the caller graph for this function:



4.9.2.10 character(len=maxmsg) function overtoppingmessages::getovertoppingmessage (integer, intent(in) *ID*)

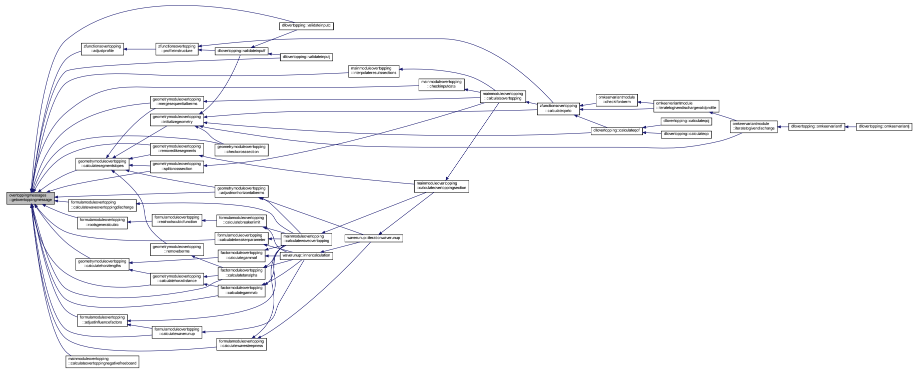
Subroutine that returns a message with the corresponding ID in the current language.

Parameters

in	*id*	identification number of string

Definition at line 129 of file OvertoppingMessages.f90.

Here is the caller graph for this function:



4.9.2.11 character(len=maxpar) function overtoppingmessages::getovertoppingparameter (integer, intent(in) *ID*)

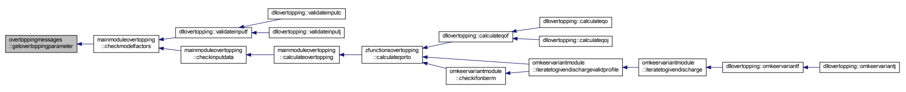
Subroutine that returns the name of an input parameter with the corresponding ID in the current language.

Parameters

in	*id*	identification number of string

Definition at line 329 of file OvertoppingMessages.f90.

Here is the caller graph for this function:


overtoppingmessages ::getovertoppingparameter
mainmoduleovertopping ::checkmodelfactors
dllovertopping::validateinputc
dllovertopping::validateinputf
dllovertopping::validateinputj
mainmoduleovertopping ::checkinputdata
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkforberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.9.2.12 subroutine overtoppingmessages::setlanguage (character(len=*), intent(in) *lang*)

IDs for the strings in this module:

Subroutine that sets the language for error and validation messages only strings 'NL' and 'UK' are recoqnized (lower and upper case)

Parameters

`in`	*lang*	new language ID to be used

Definition at line 101 of file OvertoppingMessages.f90.

4.9.3 Variable Documentation

4.9.3.1 character(len=2), private overtoppingmessages::language = 'NL'

default : Dutch

Definition at line 38 of file OvertoppingMessages.f90.

4.9.3.2 integer, parameter, private overtoppingmessages::maxmsg = 128

Definition at line 36 of file OvertoppingMessages.f90.

4.9.3.3 integer, parameter, private overtoppingmessages::maxpar =32

Definition at line 36 of file OvertoppingMessages.f90.

4.10 typedefinitionsovertopping Module Reference

type definitions for Dikes Overtopping

Data Types

- type tpgeometry

  tpGeometry: structure with geometry data
- type tpload

  tpLoad: structure with load parameters
- type tpovertopping

  tpOvertopping: structure with overtopping results
- type tpovertoppinginput

  OvertoppingModelFactors: C-structure with model factors.

Variables

- real(kind=wp), parameter frunup1 = 1.65_wp
- real(kind=wp), parameter frunup2 = 4.00_wp
- real(kind=wp), parameter frunup3 = 1.50_wp
- real(kind=wp), parameter xdiff_min = 2.0d-2

  minimal value distance between x-coordinates (m)
- real(kind=wp), parameter margindiff = 1.0d-14

  margin for minimal distance (m)

- real(kind=wp), parameter berm_min = 0.0d0

  minimal value gradient berm segment
- real(kind=wp), parameter berm_max = 1.0d0/15

  maximal value gradient berm segment
- real(kind=wp), parameter slope_min = 1.0d0/8

  minimal value gradient slope segment
- real(kind=wp), parameter slope_max = 1.0d0

  maximal value gradient slope segment
- real(kind=wp), parameter margingrad = 0.0025d0

  margin for minimal and maximal gradients
- real(kind=wp), parameter rfactor_min = 0.5d0

  minimal value roughness factor dike segments
- real(kind=wp), parameter rfactor_max = 1.0d0

  maximal value roughness factor dike segments
- real(kind=wp), parameter mz2_min = 0.0d0

  minimal value model factor of 2% runup height
- real(kind=wp), parameter mz2_max = huge(mz2_max)

  maximal value model factor of 2% runup height
- real(kind=wp), parameter fb_min = 0.0d0

  minimal value model factor for breaking waves
- real(kind=wp), parameter fb_max = huge(fB_max)

  maximal value model factor for breaking waves
- real(kind=wp), parameter fn_min = 0.0d0

  minimal value model factor for non-breaking waves
- real(kind=wp), parameter fn_max = huge(fN_max)

  maximal value model factor for non-breaking waves
- real(kind=wp), parameter fs_min = 0.0d0

  minimal value model factor for shallow waves
- real(kind=wp), parameter fs_max = huge(fS_max)

  maximal value model factor for shallow waves
- real(kind=wp), parameter foreshore_min = 0.3d0

  minimal value reduction factor foreshore
- real(kind=wp), parameter foreshore_max = 1.0d0

  maximal value reduction factor foreshore
- integer, parameter z2_iter_max1 = 49

  maximal number of iterations for calculation z2 part 1
- integer, parameter z2_iter_max2 = 70

  maximal number of iterations for calculation z2 part 1 & 2
- real(kind=wp), parameter z2_margin = 0.001d0

  margin for convergence criterium calculation z2

4.10.1 Detailed Description

type definitions for Dikes Overtopping

4.10.2 Variable Documentation

4.10.2.1 real(kind=wp), parameter typedefinitionsovertopping::berm_max = 1.0d0/15

maximal value gradient berm segment

Definition at line 91 of file typeDefinitionsOvertopping.f90.

4.10.2.2 real(kind=wp), parameter typedefinitionsovertopping::berm_min = 0.0d0

minimal value gradient berm segment

Definition at line 90 of file typeDefinitionsOvertopping.f90.

4.10.2.3 real(kind=wp), parameter typedefinitionsovertopping::fb_max = huge(fB_max)

maximal value model factor for breaking waves

Definition at line 100 of file typeDefinitionsOvertopping.f90.

4.10.2.4 real(kind=wp), parameter typedefinitionsovertopping::fb_min = 0.0d0

minimal value model factor for breaking waves

Definition at line 99 of file typeDefinitionsOvertopping.f90.

4.10.2.5 real(kind=wp), parameter typedefinitionsovertopping::fn_max = huge(fN_max)

maximal value model factor for non-breaking waves

Definition at line 102 of file typeDefinitionsOvertopping.f90.

4.10.2.6 real(kind=wp), parameter typedefinitionsovertopping::fn_min = 0.0d0

minimal value model factor for non-breaking waves

Definition at line 101 of file typeDefinitionsOvertopping.f90.

4.10.2.7 real(kind=wp), parameter typedefinitionsovertopping::foreshore_max = 1.0d0

maximal value reduction factor foreshore

Definition at line 106 of file typeDefinitionsOvertopping.f90.

4.10.2.8 real(kind=wp), parameter typedefinitionsovertopping::foreshore_min = 0.3d0

minimal value reduction factor foreshore

Definition at line 105 of file typeDefinitionsOvertopping.f90.

4.10.2.9 real(kind=wp), parameter typedefinitionsovertopping::frunup1 = 1.65_wp

Definition at line 63 of file typeDefinitionsOvertopping.f90.

4.10.2.10 real(kind=wp), parameter typedefinitionsovertopping::frunup2 = 4.00_wp

Definition at line 64 of file typeDefinitionsOvertopping.f90.

4.10.2.11 real(kind=wp), parameter typedefinitionsovertopping::frunup3 = 1.50_wp

Definition at line 65 of file typeDefinitionsOvertopping.f90.

4.10.2.12 real(kind=wp), parameter typedefinitionsovertopping::fs_max = huge(fS_max)

maximal value model factor for shallow waves

Definition at line 104 of file typeDefinitionsOvertopping.f90.

4.10.2.13 real(kind=wp), parameter typedefinitionsovertopping::fs_min = 0.0d0

minimal value model factor for shallow waves

Definition at line 103 of file typeDefinitionsOvertopping.f90.

4.10.2.14 real(kind=wp), parameter typedefinitionsovertopping::margindiff = 1.0d-14

margin for minimal distance (m)

Definition at line 89 of file typeDefinitionsOvertopping.f90.

4.10.2.15 real(kind=wp), parameter typedefinitionsovertopping::margingrad = 0.0025d0

margin for minimal and maximal gradients

Definition at line 94 of file typeDefinitionsOvertopping.f90.

4.10.2.16 real(kind=wp), parameter typedefinitionsovertopping::mz2_max = huge(mz2_max)

maximal value model factor of 2% runup height

Definition at line 98 of file typeDefinitionsOvertopping.f90.

4.10.2.17 real(kind=wp), parameter typedefinitionsovertopping::mz2_min = 0.0d0

minimal value model factor of 2% runup height

Definition at line 97 of file typeDefinitionsOvertopping.f90.

4.10.2.18 real(kind=wp), parameter typedefinitionsovertopping::rfactor_max = 1.0d0

maximal value roughness factor dike segments

Definition at line 96 of file typeDefinitionsOvertopping.f90.

4.10.2.19 real(kind=wp), parameter typedefinitionsovertopping::rfactor_min = 0.5d0

minimal value roughness factor dike segments

Definition at line 95 of file typeDefinitionsOvertopping.f90.

4.10.2.20 real(kind=wp), parameter typedefinitionsovertopping::slope_max = 1.0d0

maximal value gradient slope segment

Definition at line 93 of file typeDefinitionsOvertopping.f90.

4.10.2.21 real(kind=wp), parameter typedefinitionsovertopping::slope_min = 1.0d0/8

minimal value gradient slope segment

Definition at line 92 of file typeDefinitionsOvertopping.f90.

4.10.2.22 real(kind=wp), parameter typedefinitionsovertopping::xdiff_min = 2.0d-2

minimal value distance between x-coordinates (m)

Definition at line 88 of file typeDefinitionsOvertopping.f90.

4.10.2.23 integer, parameter typedefinitionsovertopping::z2_iter_max1 = 49

maximal number of iterations for calculation z2 part 1

Definition at line 107 of file typeDefinitionsOvertopping.f90.

4.10.2.24 integer, parameter typedefinitionsovertopping::z2_iter_max2 = 70

maximal number of iterations for calculation z2 part 1 & 2

Definition at line 108 of file typeDefinitionsOvertopping.f90.

4.10.2.25 real(kind=wp), parameter typedefinitionsovertopping::z2_margin = 0.001d0

margin for convergence criterium calculation z2

Definition at line 109 of file typeDefinitionsOvertopping.f90.

4.11 waverunup Module Reference

Iteration procedure for 2% wave runup.

Functions/Subroutines

- subroutine, public iterationwaverunup (geometry, h, Hm0, Tm_10, gammaBeta_z, modelFactors, z2, logging, succes, errorMessage)

  iterationWaveRunup: iteration for the wave runup
- real(kind=wp) function innercalculation (geometry, h, Hm0, gammaBeta_z, modelFactors, z2, s0, geometry←↩ FlatBerms, succes, errorMessage)

  innerCalculation: inner calculation for the wave runup
- real(kind=wp) function determinestartingvalue (i, relaxationFactor, z2_start, z2_end, Hm0)

  determineStartingValue: helper function to find a start value for z2
- integer function findsmallestresidu (z2_start, z2_end, n)

  findSmallestResidu: helper function to find the smallest residu
- subroutine convergedwithresidu (z2_start, z2_end, logging)

  convergedWithResidu: helper function to handle convergence with a higher residu than expected if logging is enabled, it writes a small message to the logfile

4.11.1 Detailed Description

Iteration procedure for 2% wave runup.

4.11.2 Function/Subroutine Documentation

4.11.2.1 subroutine waverunup::convergedwithresidu (real(kind=wp), dimension(:), intent(in) *z2_start*, real(kind=wp), dimension(:), intent(inout) *z2_end*, type(tlogging), intent(in) *logging*) [private]

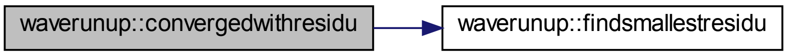
convergedWithResidu: helper function to handle convergence with a higher residu than expected if logging is enabled, it writes a small message to the logfile

Parameters

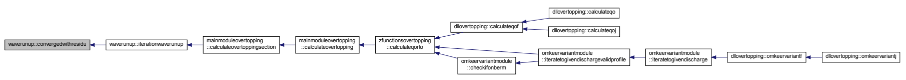
`in`	*z2_start*	array with z2 values at the start of the iteration i
`in,out`	*z2_end*	array with z2 values at the end of iteration i
`in`	*logging*	logging struct

Definition at line 373 of file waveRunup.f90.

Here is the call graph for this function:



Here is the caller graph for this function:


waverunup::convergedwithresidu
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.11.2.2 real(kind=wp) function waverunup::determinestartingvalue (integer, intent(in) *i*, real(kind=wp), intent(in) *relaxationFactor*, real(kind=wp), dimension(:), intent(in) *z2_start*, real(kind=wp), dimension(:), intent(in) *z2_end*, real(kind=wp), intent(in) *Hm0*) [private]

determineStartingValue: helper function to find a start value for z2

Parameters

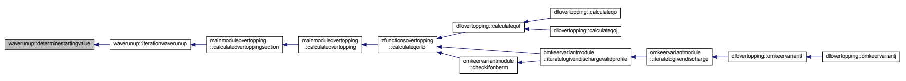
`in`	*i*	current iteration number
`in`	*relaxationfactor*	relaxation factor as given by user
`in`	*z2_start*	array with z2 values at the start of the iteration i
`in`	*z2_end*	array with z2 values at the end of iteration i
`in`	*hm0*	significant wave height

Returns

return value: start value for z2 in current iteration

Definition at line 292 of file waveRunup.f90.

Here is the caller graph for this function:


waverunup::determinestartingvalue
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.11.2.3 integer function waverunup::findsmallestresidu (real(kind=wp), dimension(:), intent(in) *z2_start*, real(kind=wp), dimension(:), intent(in) *z2_end*, integer, intent(in), optional *n*) `[private]`

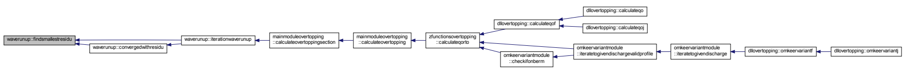
findSmallestResidu: helper function to find the smallest residu

Parameters

`in`	*z2_start*	array with z2 values at the start of the iteration i
`in`	*z2_end*	array with z2 values at the end of iteration i
`in`	*n*	number of iterations already done

Definition at line 330 of file waveRunup.f90.

Here is the caller graph for this function:


waverunup::findsmallestresidu
waverunup::convergedwithresidu
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.11.2.4 real(kind=wp) function waverunup::innercalculation (type (tpgeometry), intent(in) *geometry*, real(kind=wp), intent(in) *h*, real(kind=wp), intent(in) *Hm0*, real(kind=wp), intent(inout) *gammaBeta_z*, type (tpovertoppinginput), intent(in) *modelFactors*, real(kind=wp), intent(in) *z2*, real(kind=wp), intent(in) *s0*, type (tpgeometry), intent(in) *geometryFlatBerms*, logical, intent(out) *succes*, character(len=∗), intent(out) *errorMessage*) `[private]`

innerCalculation: inner calculation for the wave runup

Parameters

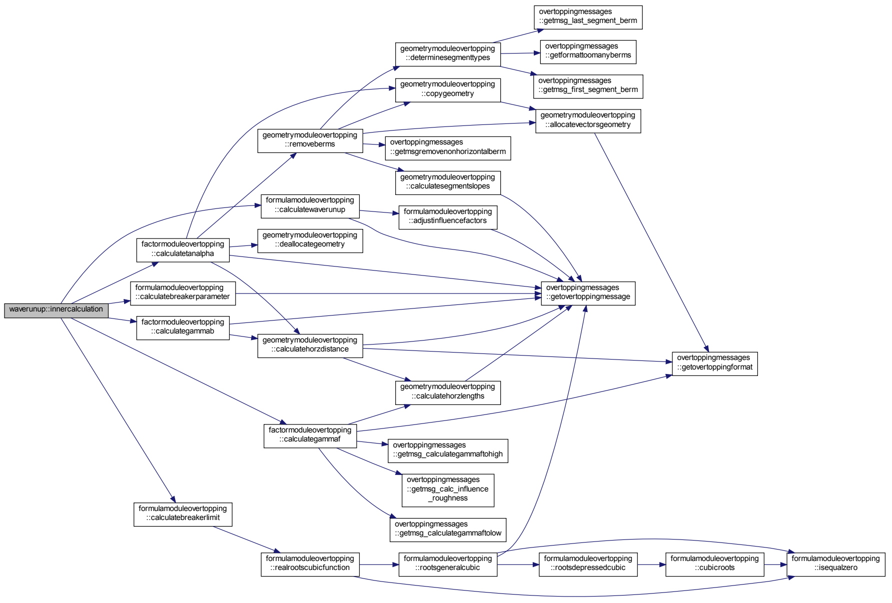
`in`	*geometry*	structure with geometry data
`in`	*h*	local water level (m+NAP)
`in`	*hm0*	significant wave height (m)
`in,out`	*gammabeta_z*	influence factor angle wave attack 2% run-up
`in`	*modelfactors*	structure with model factors
`in`	*z2*	2% wave run-up (m)
`in`	*s0*	wave steepness
`in`	*geometryflat-berms*	structure with geometry data with horizontal berms
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Returns

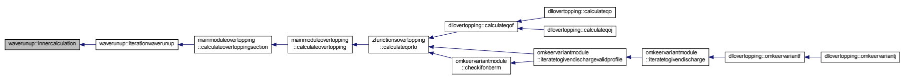
2% wave run-up at end of inner calculation

Definition at line 181 of file waveRunup.f90.

Here is the call graph for this function:


waverunup::innercalculation
factormoduleovertopping ::calculatetanalpha
formulamoduleovertopping ::calculatebreakerparameter
factormoduleovertopping ::calculategammab
factormoduleovertopping ::calculategammaf
formulamoduleovertopping ::calculatebreakerlimit
formulamoduleovertopping ::calculatewaverunup
geometrymoduleovertopping ::removeberms
geometrymoduleovertopping ::deallocategeometry
geometrymoduleovertopping ::calculatehorzdistance
geometrymoduleovertopping ::calculatehorzlengths
geometrymoduleovertopping ::determinesegmenttypes
geometrymoduleovertopping ::copygeometry
geometrymoduleovertopping ::calculatesegmentslopes
geometrymoduleovertopping ::allocatevectorsgeometry
formulamoduleovertopping ::adjustinfluencefactors
overtoppingmessages ::getmsg_last_segment_berm
overtoppingmessages ::getformattoomanyberms
overtoppingmessages ::getmsg_first_segment_berm
overtoppingmessages ::getmsgremovenonhorizontalberm
overtoppingmessages ::getovertoppingmessage
overtoppingmessages ::getovertoppingformat
overtoppingmessages ::getmsg_calculategammaftohigh
overtoppingmessages ::getmsg_calc_influence _roughness
overtoppingmessages ::getmsg_calculategammaftolow
formulamoduleovertopping ::realrootscubicfunction
formulamoduleovertopping ::rootsgeneralcubic
formulamoduleovertopping ::rootsdepressedcubic
formulamoduleovertopping ::cubicroots
formulamoduleovertopping ::isequalzero

Here is the caller graph for this function:


waverunup::innercalculation
waverunup::iterationwaverunup
mainmoduleovertopping ::calculateovertoppingsection
mainmoduleovertopping ::calculateovertopping
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.11.2.5 subroutine, public waverunup::iterationwaverunup (type (tpgeometry), intent(in) *geometry,* real(kind=wp), intent(in) *h,* real(kind=wp), intent(in) *Hm0,* real(kind=wp), intent(in) *Tm_10,* real(kind=wp), intent(inout) *gammaBeta_z,* type (tpovertoppinginput), intent(in) *modelFactors,* real(kind=wp), intent(out) *z2,* type(tlogging), intent(in) *logging,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

iterationWaveRunup: iteration for the wave runup

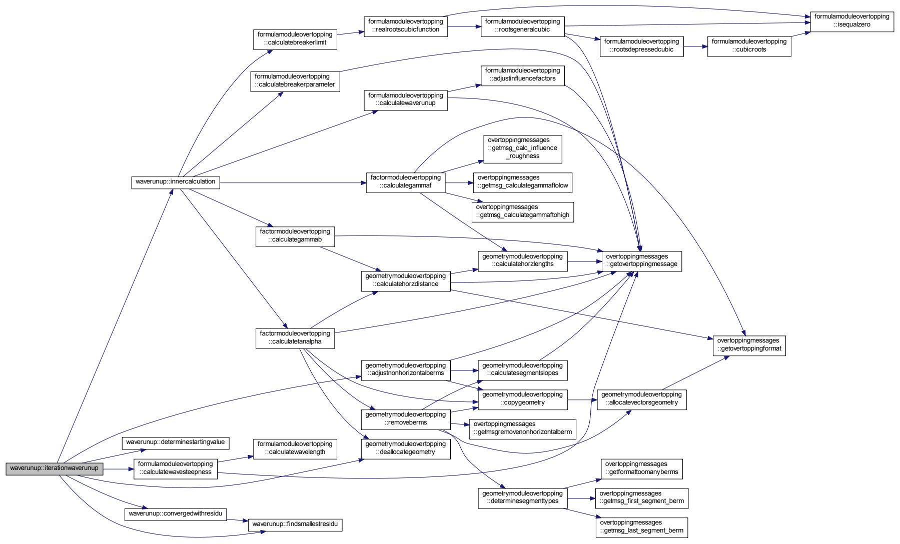
Parameters

in	*geometry*	structure with geometry data
in	*h*	local water level (m+NAP)
in	*hm0*	significant wave height (m)
in	*tm_10*	spectral wave period (s)
in,out	*gammabeta_z*	influence factor angle wave attack 2% run-up
in	*modelfactors*	structure with model factors

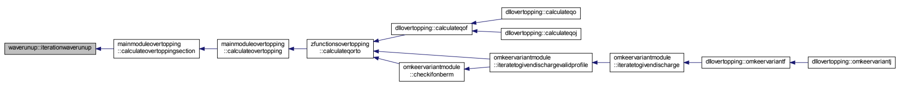
out	*z2*	2% wave run-up (m)
in	*logging*	logging struct
out	*succes*	flag for succes
out	*errormessage*	error message

Definition at line 58 of file waveRunup.f90.

Here is the call graph for this function:


waverunup::iterationwaverunup
waverunup::innercalculation
formulamoduleovertopping::calculatebreakerlimit
formulamoduleovertopping::realrootscubicfunction
formulamoduleovertopping::rootsgeneralcubic
formulamoduleovertopping::isequalzero
formulamoduleovertopping::rootsdepressedcubic
formulamoduleovertopping::cubicroots
formulamoduleovertopping::calculatebreakerparameter
formulamoduleovertopping::adjustinfluencefactors
formulamoduleovertopping::calculatewaverunup
overtoppingmessages::getmsg_calc_influence_roughness
factormoduleovertopping::calculategammaf
overtoppingmessages::getmsg_calculategammaftolow
overtoppingmessages::getmsg_calculategammaftohigh
factormoduleovertopping::calculategammab
geometrymoduleovertopping::calculatehorzlengths
overtoppingmessages::getovertoppingmessage
geometrymoduleovertopping::calculatehorzdistance
overtoppingmessages::getovertoppingformat
factormoduleovertopping::calculatetanalpha
geometrymoduleovertopping::adjustnonhorizontalberms
geometrymoduleovertopping::calculatesegmentslopes
geometrymoduleovertopping::copygeometry
geometrymoduleovertopping::allocatevectorsgeometry
geometrymoduleovertopping::removeberms
overtoppingmessages::getmsgremovenonhorizontalberm
waverunup::determinestartingvalue
formulamoduleovertopping::calculatewavelength
geometrymoduleovertopping::deallocategeometry
formulamoduleovertopping::calculatewavesteepness
overtoppingmessages::getformattoomanyberms
geometrymoduleovertopping::determinesegmenttypes
overtoppingmessages::getmsg_first_segment_berm
overtoppingmessages::getmsg_last_segment_berm
waverunup::convergedwithresidu
waverunup::findsmallestresidu

Here is the caller graph for this function:


waverunup::iterationwaverunup
mainmoduleovertopping::calculateovertoppingsection
mainmoduleovertopping::calculateovertopping
zfunctionsovertopping::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule::checkifonberm
omkeervariantmodule::iteratetogivendischargevalidprofile
omkeervariantmodule::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.12 zfunctionsovertopping Module Reference

Module for the Limit State Functions (Z-functions) for wave overtopping.

Functions/Subroutines

- subroutine, public calculateqorto (dikeHeight, modelFactors, overtopping, load, geometry, logging, succes, errorMessage)

  Subroutine to calculate the overtopping discharge with the Overtopping dll.
- subroutine, public profileinstructure (nrCoordinates, xcoordinates, ycoordinates, dikeHeight, nrCoords←↩ Adjusted, xCoordsAdjusted, zCoordsAdjusted, succes, errorMessage)

  Subroutine to fill the profile in a structure and call the adjustment function of the profile due to a desired dike height.
- subroutine adjustprofile (nrCoordinates, coordinates, dikeHeight, nrCoordsAdjusted, xCoordsAdjusted, z←↩ CoordsAdjusted, succes, errorMessage)

  Subroutine adjust the profile due to a desired dike height.
- real(kind=wp) function, public zfunclogratios (qo, qc, mqo, mqc, success, errorMessage)

  Routine to compute the limit state value by using the logs of the overtopping discharges (computed and desired)

4.12.1 Detailed Description

Module for the Limit State Functions (Z-functions) for wave overtopping.

4.12.2 Function/Subroutine Documentation

4.12.2.1 subroutine zfunctionsovertopping::adjustprofile (integer, intent(in) *nrCoordinates,* type(tpprofilecoordinate), dimension(nrcoordinates), intent(in) *coordinates,* real(kind=wp), intent(in) *dikeHeight,* integer, intent(out) *nrCoordsAdjusted,* real(kind=wp), dimension(:), pointer *xCoordsAdjusted,* real(kind=wp), dimension(:), pointer *zCoordsAdjusted,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*) `[private]`

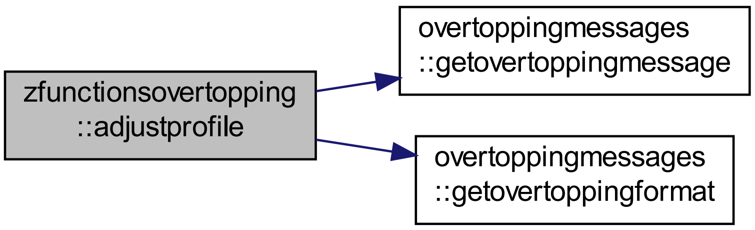
Subroutine adjust the profile due to a desired dike height.

Parameters

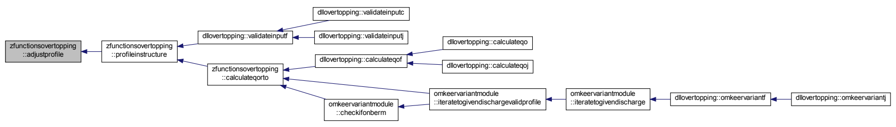
`in`	*nrcoordinates*	number of coordinates of the profile
`in`	*coordinates*	structure for the profile
`in`	*dikeheight*	dike height
`out`	*nrcoordsad-justed*	number of coordinates in the adjusted profile
	xcoordsadjusted	vector with x-coordinates of the adjusted profile
	zcoordsadjusted	vector with y-coordinates of the adjusted profile
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 131 of file zFunctionsOvertopping.f90.

Here is the call graph for this function:


zfunctionsovertopping ::adjustprofile
overtoppingmessages ::getovertoppingmessage
overtoppingmessages ::getovertoppingformat

Here is the caller graph for this function:


zfunctionsovertopping ::adjustprofile
zfunctionsovertopping ::profileinstructure
dllovertopping::validateinputf
dllovertopping::validateinputc
dllovertopping::validateinputj
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.12.2.2 subroutine, public zfunctionsovertopping::calculateqorto (real(kind=wp), intent(in) *dikeHeight,* type(tpovertoppinginput), intent(inout) *modelFactors,* type (tpovertopping), intent(out) *overtopping,* type (tpload), intent(in) *load,* type (tpgeometry), intent(in) *geometry,* type(tlogging), intent(in) *logging,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

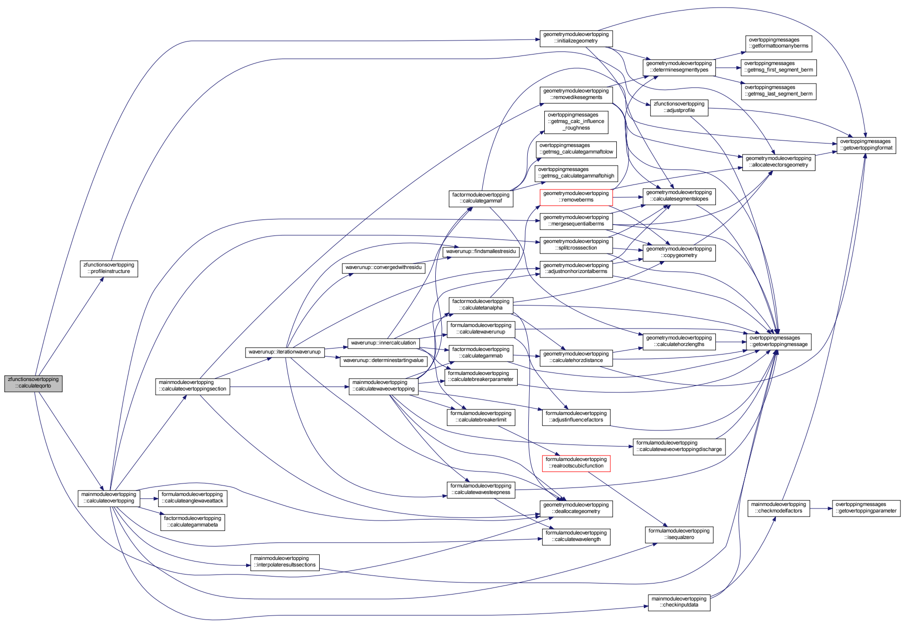
Subroutine to calculate the overtopping discharge with the Overtopping dll.

Parameters

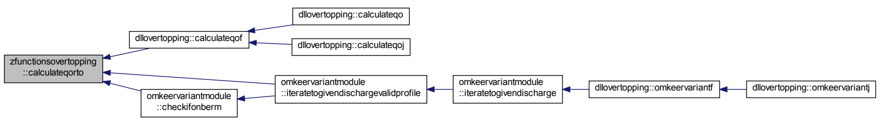
`in`	*dikeheight*	dike height
`in,out`	*modelfactors*	struct with model factors
`out`	*overtopping*	structure with overtopping results
`in`	*geometry*	structure with geometry data
`in`	*load*	structure with load parameters
`in`	*logging*	logging struct
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 56 of file zFunctionsOvertopping.f90.

Here is the call graph for this function:



Here is the caller graph for this function:



dllovertopping::calculateqo
dllovertopping::calculateqof
dllovertopping::calculateqoj
zfunctionsovertopping ::calculateqorto
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj
omkeervariantmodule ::checkifonberm

4.12.2.3 subroutine, public zfunctionsovertopping::profileinstructure (integer, intent(in) *nrCoordinates,* real(kind=wp), dimension(nrcoordinates), intent(in) *xcoordinates,* real(kind=wp), dimension(nrcoordinates), intent(in) *ycoordinates,* real(kind=wp), intent(in) *dikeHeight,* integer, intent(out) *nrCoordsAdjusted,* real(kind=wp), dimension(:), pointer *xCoordsAdjusted,* real(kind=wp), dimension(:), pointer *zCoordsAdjusted,* logical, intent(out) *succes,* character(len=∗), intent(out) *errorMessage*)

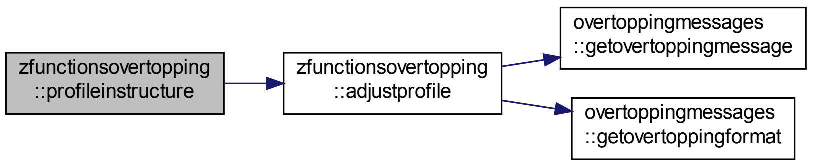
Subroutine to fill the profile in a structure and call the adjustment function of the profile due to a desired dike height.

Parameters

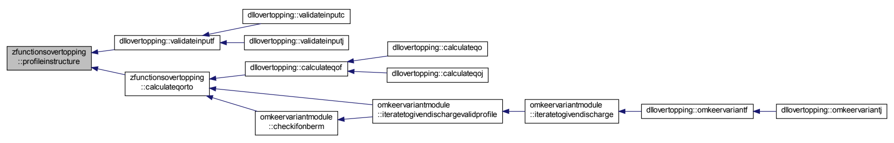
`in`	*nrcoordinates*	number of coordinates of the profile
`in`	*xcoordinates*	vector with x-coordinates of the profile
`in`	*ycoordinates*	vector with y-coordinates of the profile
`in`	*dikeheight*	dike height
`out`	*nrcoordsad-justed*	number of coordinates in the adjusted profile
	xcoordsadjusted	vector with x-coordinates of the adjusted profile
	zcoordsadjusted	vector with y-coordinates of the adjusted profile
`out`	*succes*	flag for succes
`out`	*errormessage*	error message

Definition at line 106 of file zFunctionsOvertopping.f90.

Here is the call graph for this function:


zfunctionsovertopping ::profileinstructure
zfunctionsovertopping ::adjustprofile
overtoppingmessages ::getovertoppingmessage
overtoppingmessages ::getovertoppingformat

Here is the caller graph for this function:


zfunctionsovertopping ::profileinstructure
dllovertopping::validateinputf
dllovertopping::validateinputc
dllovertopping::validateinputj
zfunctionsovertopping ::calculateqorto
dllovertopping::calculateqof
dllovertopping::calculateqo
dllovertopping::calculateqoj
omkeervariantmodule ::iteratetogivendischargevalidprofile
omkeervariantmodule ::checkifonberm
omkeervariantmodule ::iteratetogivendischarge
dllovertopping::omkeervariantf
dllovertopping::omkeervariantj

4.12.2.4 real (kind=wp) function, public zfunctionsovertopping::zfunclogratios (real (kind=wp), intent(in) *qo*, real (kind=wp), intent(in) *qc*, real (kind=wp), intent(in) *mqo*, real (kind=wp), intent(in) *mqc*, logical, intent(out) *success*, character(len=∗), intent(out) *errorMessage*)

Routine to compute the limit state value by using the logs of the overtopping discharges (computed and desired)

Parameters

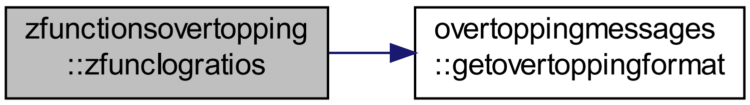
`in`	*qo*	computed overtopping discharge
`in`	*qc*	Critical overtopping discharge
`in`	*mqo*	Model factor computed overtopping discharge
`in`	*mqc*	Model factor Critical overtopping discharge
`out`	*success*	Flag for succes
`out`	*errormessage*	error message, only set if not successful

Returns

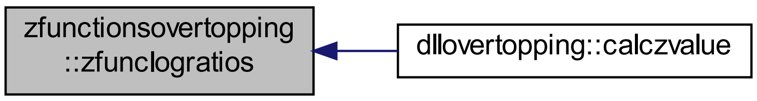
Value z-function

Definition at line 241 of file zFunctionsOvertopping.f90.

Here is the call graph for this function:


zfunctionsovertopping ::zfunclogratios
overtoppingmessages ::getovertoppingformat

Here is the caller graph for this function:

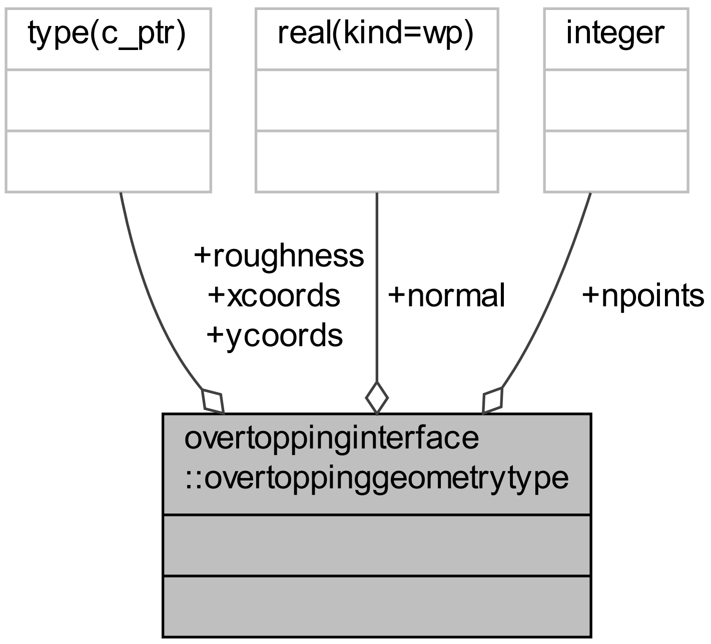

zfunctionsovertopping ::zfunclogratios
dllovertopping::calczvalue

Chapter 5

Data Type Documentation

5.1 overtoppinginterface::overtoppinggeometrytype Type Reference

Collaboration diagram for overtoppinginterface::overtoppinggeometrytype:



Public Attributes

- real(kind=wp) normal
- integer npoints
- type(c_ptr) xcoords
- type(c_ptr) ycoords
- type(c_ptr) roughness

5.1.1 Detailed Description

Definition at line 46 of file overtoppingInterface.f90.

5.1.2 Member Data Documentation

5.1.2.1 real(kind=wp) overtoppinginterface::overtoppinggeometrytype::normal

Definition at line 47 of file overtoppingInterface.f90.

5.1.2.2 integer overtoppinginterface::overtoppinggeometrytype::npoints

Definition at line 48 of file overtoppingInterface.f90.

5.1.2.3 type(c_ptr) overtoppinginterface::overtoppinggeometrytype::roughness

Definition at line 51 of file overtoppingInterface.f90.

5.1.2.4 type(c_ptr) overtoppinginterface::overtoppinggeometrytype::xcoords

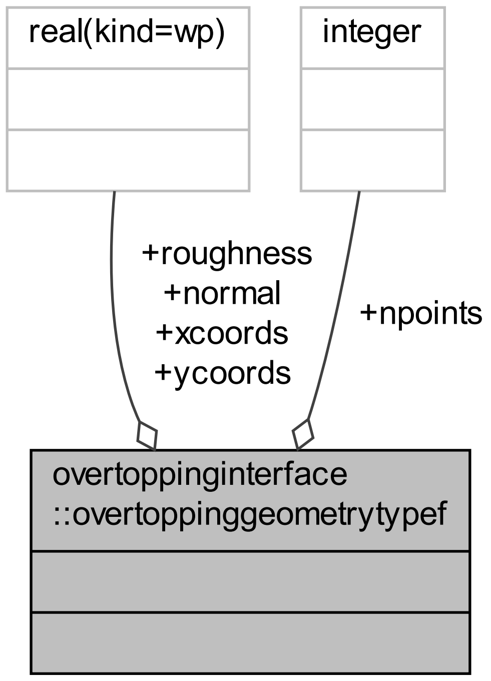
Definition at line 49 of file overtoppingInterface.f90.

5.1.2.5 type(c_ptr) overtoppinginterface::overtoppinggeometrytype::ycoords

Definition at line 50 of file overtoppingInterface.f90.

5.2 overtoppinginterface::overtoppinggeometrytypef Type Reference

Collaboration diagram for overtoppinginterface::overtoppinggeometrytypef:



Public Attributes

- real(kind=wp) normal
- integer npoints
- real(kind=wp), dimension(:), pointer xcoords
- real(kind=wp), dimension(:), pointer ycoords
- real(kind=wp), dimension(:), pointer roughness

5.2.1 Detailed Description

Definition at line 54 of file overtoppingInterface.f90.

5.2.2 Member Data Documentation

5.2.2.1 real(kind=wp) overtoppinginterface::overtoppinggeometrytypef::normal

Definition at line 55 of file overtoppingInterface.f90.

5.2.2.2 integer overtoppinginterface::overtoppinggeometrytypef::npoints

Definition at line 56 of file overtoppingInterface.f90.

5.2.2.3 real(kind=wp), dimension(:), pointer overtoppinginterface::overtoppinggeometrytypef::roughness

Definition at line 59 of file overtoppingInterface.f90.

5.2.2.4 real(kind=wp), dimension(:), pointer overtoppinginterface::overtoppinggeometrytypef::xcoords

Definition at line 57 of file overtoppingInterface.f90.

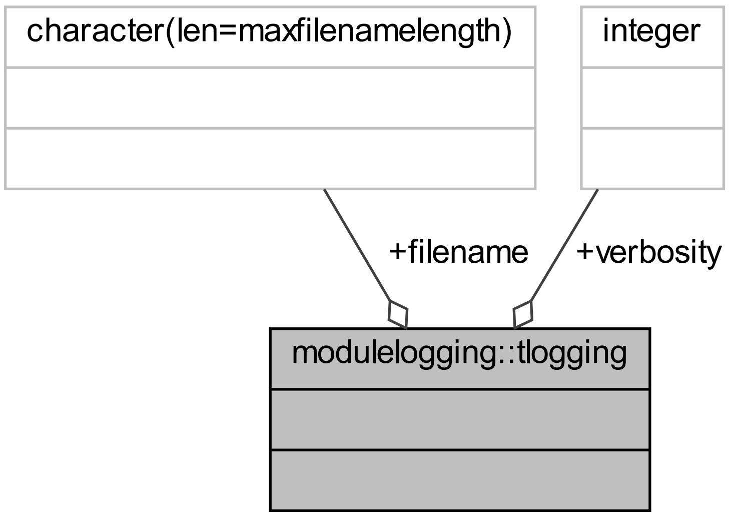
5.2.2.5 real(kind=wp), dimension(:), pointer overtoppinginterface::overtoppinggeometrytypef::ycoords

Definition at line 58 of file overtoppingInterface.f90.

5.3 modulelogging::tlogging Type Reference

TLogging: structure for steering the logging.

Collaboration diagram for modulelogging::tlogging:



Public Attributes

- integer verbosity = verboseNone

  level of verbosity: one of verboseNone, verboseBasic, verboseDetailed, verboseDebugging
- character(len=maxfilenamelength) filename = ' '

  filename of logging

5.3.1 Detailed Description

TLogging: structure for steering the logging.

Definition at line 38 of file ModuleLogging.f90.

5.3.2 Member Data Documentation

5.3.2.1 character(len=maxfilenamelength) modulelogging::tlogging::filename = ' '

filename of logging

Definition at line 40 of file ModuleLogging.f90.

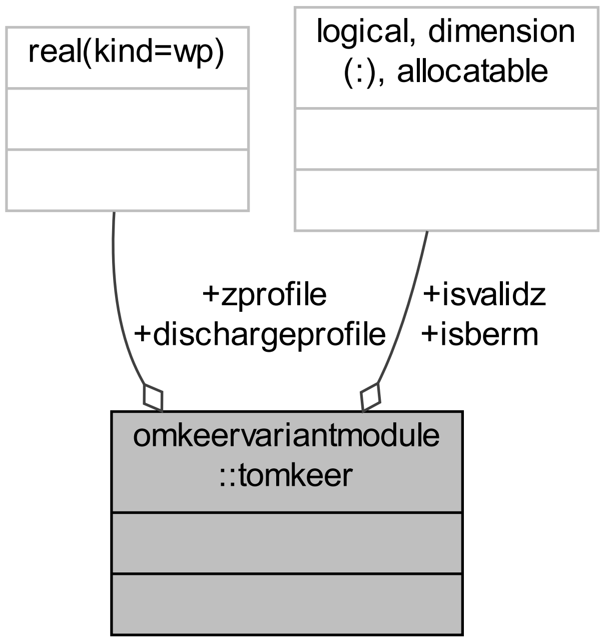
5.3.2.2 integer modulelogging::tlogging::verbosity = verboseNone

level of verbosity: one of verboseNone, verboseBasic, verboseDetailed, verboseDebugging

Definition at line 39 of file ModuleLogging.f90.

5.4 omkeervariantmodule::tomkeer Type Reference

Collaboration diagram for omkeervariantmodule::tomkeer:


real(kind=wp)
logical, dimension (:), allocatable
+zprofile +dischargeprofile
+isvalidz +isberm
omkeervariantmodule ::tomkeer

Public Attributes

- logical, dimension(:), allocatable isberm
- logical, dimension(:), allocatable isvalidz
- real(kind=wp), dimension(:), allocatable dischargeprofile
- real(kind=wp), dimension(:), allocatable zprofile

5.4.1 Detailed Description

Definition at line 48 of file omkeerVariantModule.f90.

5.4.2 Member Data Documentation

5.4.2.1 real(kind=wp), dimension(:), allocatable omkeervariantmodule::tomkeer::dischargeprofile

Definition at line 51 of file omkeerVariantModule.f90.

5.4.2.2 logical, dimension(:), allocatable omkeervariantmodule::tomkeer::isberm

Definition at line 49 of file omkeerVariantModule.f90.

5.4.2.3 logical, dimension(:), allocatable omkeervariantmodule::tomkeer::isvalidz

Definition at line 50 of file omkeerVariantModule.f90.

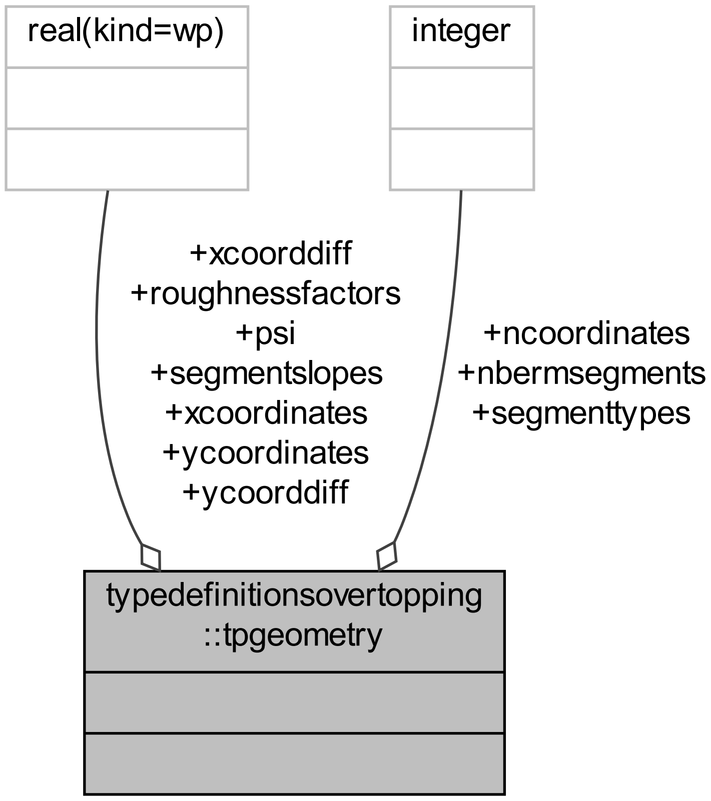
5.4.2.4 real(kind=wp), dimension(:), allocatable omkeervariantmodule::tomkeer::zprofile

Definition at line 52 of file omkeerVariantModule.f90.

5.5 typedefinitionsovertopping::tpgeometry Type Reference

tpGeometry: structure with geometry data

Collaboration diagram for typedefinitionsovertopping::tpgeometry:



Public Attributes

- real(kind=wp) psi

  dike normal (degrees)
- integer ncoordinates

  number of coordinates cross section
- real(kind=wp), dimension(:), pointer xcoordinates => null()

  vector with x-coordinates cross section (m)
- real(kind=wp), dimension(:), pointer ycoordinates => null()

  vector with y-coordinates cross section (m+NAP)
- real(kind=wp), dimension(:), pointer roughnessfactors => null()

  vector with roughness factors cross section
- real(kind=wp), dimension(:), pointer xcoorddiff => null()

  vector with differences in x-coordinates (m)
- real(kind=wp), dimension(:), pointer ycoorddiff => null()

  vector with differences in y-coordinates (m)
- real(kind=wp), dimension(:), pointer segmentslopes => null()

  vector with slopes dike segments
- integer, dimension(:), pointer segmenttypes

vector with segment types (1=slope,2=berm,3=other)

- integer nbermsegments

  number of berm segments

5.5.1 Detailed Description

tpGeometry: structure with geometry data

Definition at line 42 of file typeDefinitionsOvertopping.f90.

5.5.2 Member Data Documentation

5.5.2.1 integer typedefinitionsovertopping::tpgeometry::nbermsegments

number of berm segments

Definition at line 52 of file typeDefinitionsOvertopping.f90.

5.5.2.2 integer typedefinitionsovertopping::tpgeometry::ncoordinates

number of coordinates cross section

Definition at line 44 of file typeDefinitionsOvertopping.f90.

5.5.2.3 real(kind=wp) typedefinitionsovertopping::tpgeometry::psi

dike normal (degrees)

Definition at line 43 of file typeDefinitionsOvertopping.f90.

5.5.2.4 real(kind=wp), dimension(:), pointer typedefinitionsovertopping::tpgeometry::roughnessfactors => null()

vector with roughness factors cross section

Definition at line 47 of file typeDefinitionsOvertopping.f90.

5.5.2.5 real(kind=wp), dimension(:), pointer typedefinitionsovertopping::tpgeometry::segmentslopes => null()

vector with slopes dike segments

Definition at line 50 of file typeDefinitionsOvertopping.f90.

5.5.2.6 integer, dimension(:), pointer typedefinitionsovertopping::tpgeometry::segmenttypes

vector with segment types (1=slope,2=berm,3=other)

Definition at line 51 of file typeDefinitionsOvertopping.f90.

5.5.2.7 real(kind=wp), dimension(:), pointer typedefinitionsovertopping::tpgeometry::xcoorddiff => null()

vector with differences in x-coordinates (m)

Definition at line 48 of file typeDefinitionsOvertopping.f90.

5.5.2.8 real(kind=wp), dimension(:), pointer typedefinitionsovertopping::tpgeometry::xcoordinates => null()

vector with x-coordinates cross section (m)

Definition at line 45 of file typeDefinitionsOvertopping.f90.

5.5.2.9 real(kind=wp), dimension(:), pointer typedefinitionsovertopping::tpgeometry::ycoorddiff => null()

vector with differences in y-coordinates (m)

Definition at line 49 of file typeDefinitionsOvertopping.f90.

5.5.2.10 real(kind=wp), dimension(:), pointer typedefinitionsovertopping::tpgeometry::ycoordinates => null()

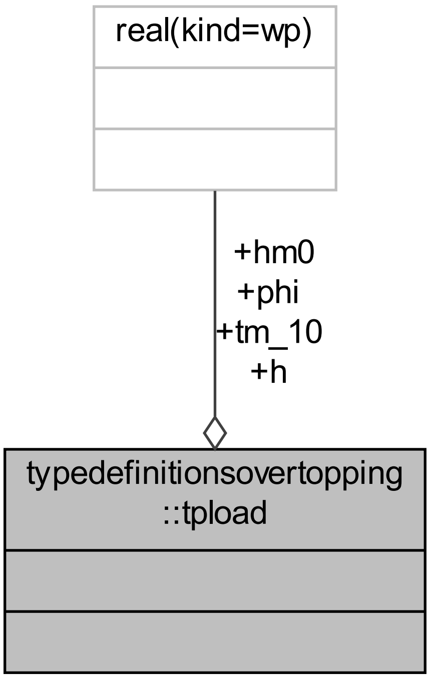
vector with y-coordinates cross section (m+NAP)

Definition at line 46 of file typeDefinitionsOvertopping.f90.

5.6 typedefinitionsovertopping::tpload Type Reference

tpLoad: structure with load parameters

Collaboration diagram for typedefinitionsovertopping::tpload:



Public Attributes

- real(kind=wp) h

local water level (m+NAP)

- real(kind=wp) hm0

  significant wave height (m)

- real(kind=wp) tm_10

  spectral wave period (s)

- real(kind=wp) phi

  wave direction (degrees)

5.6.1 Detailed Description

tpLoad: structure with load parameters

Definition at line 56 of file typeDefinitionsOvertopping.f90.

5.6.2 Member Data Documentation

5.6.2.1 real(kind=wp) typedefinitionsovertopping::tpload::h

local water level (m+NAP)

Definition at line 57 of file typeDefinitionsOvertopping.f90.

5.6.2.2 real(kind=wp) typedefinitionsovertopping::tpload::hm0

significant wave height (m)

Definition at line 58 of file typeDefinitionsOvertopping.f90.

5.6.2.3 real(kind=wp) typedefinitionsovertopping::tpload::phi

wave direction (degrees)

Definition at line 60 of file typeDefinitionsOvertopping.f90.

5.6.2.4 real(kind=wp) typedefinitionsovertopping::tpload::tm_10

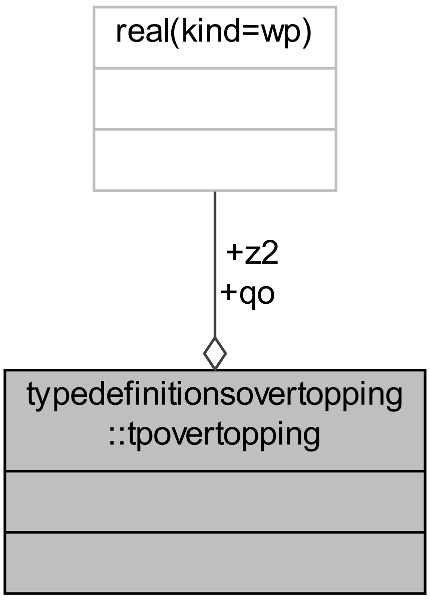
spectral wave period (s)

Definition at line 59 of file typeDefinitionsOvertopping.f90.

5.7 typedefinitionsovertopping::tpovertopping Type Reference

tpOvertopping: structure with overtopping results

Collaboration diagram for typedefinitionsovertopping::tpovertopping:



Public Attributes

- real(kind=wp) z2

  2% wave run-up (m)
- real(kind=wp) qo

  wave overtopping discharge (m3/m per s)

5.7.1 Detailed Description

tpOvertopping: structure with overtopping results

Definition at line 80 of file typeDefinitionsOvertopping.f90.

5.7.2 Member Data Documentation

5.7.2.1 real(kind=wp) typedefinitionsovertopping::tpovertopping::qo

wave overtopping discharge (m3/m per s)

Definition at line 82 of file typeDefinitionsOvertopping.f90.

5.7.2.2 real(kind=wp) typedefinitionsovertopping::tpovertopping::z2

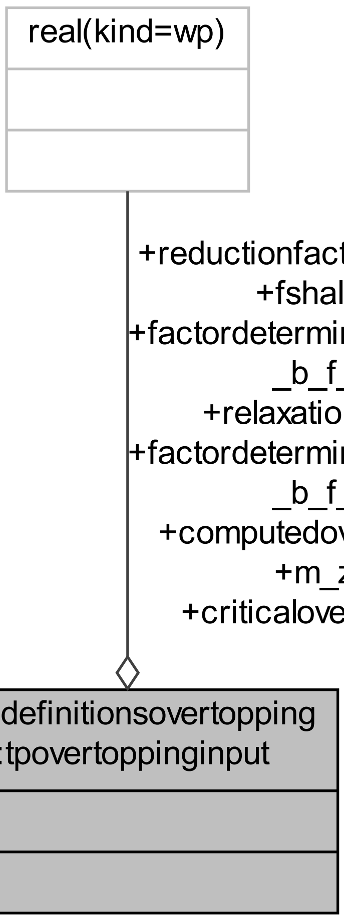
2% wave run-up (m)

Definition at line 81 of file typeDefinitionsOvertopping.f90.

5.8 typedefinitionsovertopping::tpovertoppinginput Type Reference

OvertoppingModelFactors: C-structure with model factors.

Collaboration diagram for typedefinitionsovertopping::tpovertoppinginput:


real(kind=wp)
+reductionfactorforeshore
+fshallow
+factordeterminationq_b_f_n
+relaxationfactor
+factordeterminationq_b_f_b
+computedovertopping
+m_z2
+criticalovertopping
typedefinitionsovertopping::tpovertoppinginput

Public Attributes

- real(kind=wp) factordeterminationq_b_f_n

    model factor for non-breaking waves
- real(kind=wp) factordeterminationq_b_f_b

    model factor for breaking waves
- real(kind=wp) m_z2

    model factor describing the uncertainty of 2% runup height
- real(kind=wp) fshallow

    model factor for shallow waves
- real(kind=wp) computedovertopping

    model factor computed overtopping
- real(kind=wp) criticalovertopping

model factor critical overtopping
- real(kind=wp) relaxationfactor

  relaxation factor iteration procedure wave runup
- real(kind=wp) reductionfactorforeshore = 0.5_wp

  reduction factor foreshore

5.8.1 Detailed Description

OvertoppingModelFactors: C-structure with model factors.

Definition at line 68 of file typeDefinitionsOvertopping.f90.

5.8.2 Member Data Documentation

5.8.2.1 real(kind=wp) typedefinitionsovertopping::tpovertoppinginput::computedovertopping

model factor computed overtopping

Definition at line 73 of file typeDefinitionsOvertopping.f90.

5.8.2.2 real(kind=wp) typedefinitionsovertopping::tpovertoppinginput::criticalovertopping

model factor critical overtopping

Definition at line 74 of file typeDefinitionsOvertopping.f90.

5.8.2.3 real(kind=wp) typedefinitionsovertopping::tpovertoppinginput::factordeterminationq_b_f_b

model factor for breaking waves

Definition at line 70 of file typeDefinitionsOvertopping.f90.

5.8.2.4 real(kind=wp) typedefinitionsovertopping::tpovertoppinginput::factordeterminationq_b_f_n

model factor for non-breaking waves

Definition at line 69 of file typeDefinitionsOvertopping.f90.

5.8.2.5 real(kind=wp) typedefinitionsovertopping::tpovertoppinginput::fshallow

model factor for shallow waves

Definition at line 72 of file typeDefinitionsOvertopping.f90.

5.8.2.6 real(kind=wp) typedefinitionsovertopping::tpovertoppinginput::m_z2

model factor describing the uncertainty of 2% runup height

Definition at line 71 of file typeDefinitionsOvertopping.f90.

5.8.2.7 real(kind=wp) typedefinitionsovertopping::tpovertoppinginput::reductionfactorforeshore = 0.5_wp

reduction factor foreshore

Definition at line 76 of file typeDefinitionsOvertopping.f90.

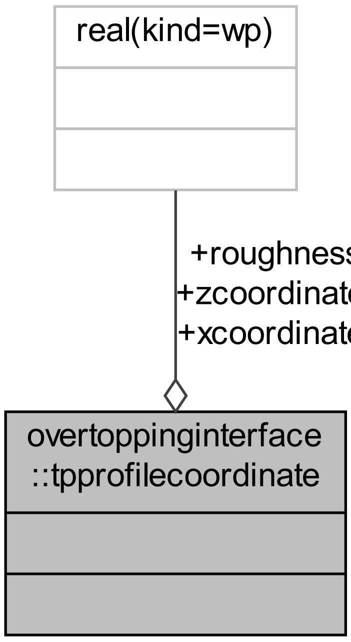
5.8.2.8 real(kind=wp) typedefinitionsovertopping::tpovertoppinginput::relaxationfactor

relaxation factor iteration procedure wave runup

Definition at line 75 of file typeDefinitionsOvertopping.f90.

5.9 overtoppinginterface::tpprofilecoordinate Type Reference

Collaboration diagram for overtoppinginterface::tpprofilecoordinate:



Public Attributes

- real(kind=wp) xcoordinate

  X-coordinate foreland profile.
- real(kind=wp) zcoordinate

  Z-coordinate foreland profile.
- real(kind=wp) roughness

  Roughness of the area between two points.

5.9.1 Detailed Description

Definition at line 40 of file overtoppingInterface.f90.

5.9.2 Member Data Documentation

5.9.2.1 real(kind=wp) overtoppinginterface::tpprofilecoordinate::roughness

Roughness of the area between two points.

Definition at line 43 of file overtoppingInterface.f90.

5.9.2.2 real(kind=wp) overtoppinginterface::tpprofilecoordinate::xcoordinate

X-coordinate foreland profile.

Definition at line 41 of file overtoppingInterface.f90.

5.9.2.3 real(kind=wp) overtoppinginterface::tpprofilecoordinate::zcoordinate

Z-coordinate foreland profile.

Definition at line 42 of file overtoppingInterface.f90.

Chapter 6

File Documentation

6.1 dllOvertopping.f90 File Reference

Main entry for the dll DikesOvertopping FUNCTIONS/SUBROUTINES exported from dllOvertopping.dll:

Modules

- module dllovertopping

  Main entry for the dll DikesOvertopping.

Functions/Subroutines

- subroutine, public dllovertopping::calculateqo (load, geometryInput, dikeHeight, modelFactors, overtopping, success, errorText, verbosity, logFile)

  Subroutine that calculates the discharge needed for the Z-function DikesOvertopping Wrapper for calculateQoF←→ : convert C-like input structures to Fortran input structures.
- subroutine, public dllovertopping::calculateqoj (load, xcoords, ycoords, roughness, normal, npoints, dike←→ Height, modelFactors, output, succes, errorMessage)

  Subroutine that calculates the discharge Wrapper for calculateQoF: convert basic types to Fortran input structures.
- subroutine, public dllovertopping::calculateqof (load, geometryF, dikeHeight, modelFactors, overtopping, success, errorText, logging)

  Subroutine that calculates the discharge needed for the Z-function DikesOvertopping.
- subroutine, public dllovertopping::calczvalue (criticalOvertoppingRate, modelFactors, Qo, z, success, error←→ Message)

  Subroutine that calculates the Z-function DikesOvertopping based on the discharge calculated with calculateQoF.
- subroutine, public dllovertopping::validateinputc (geometryInput, dikeHeight, modelFactors, success, error←→ Text)

  Subroutine that validates the geometry Wrapper for ValidateInputF: convert C-like input structures to Fortran input structures.
- subroutine, public dllovertopping::validateinputj (x, y, roughness, normal, nPoints, dikeHeight, modelFactors←→ Array, success, errorText)

  Subroutine that validates the geometry Wrapper for ValidateInputF: convert basic types to Fortran input structures.
- subroutine, public dllovertopping::validateinputf (geometryF, dikeHeight, modelFactors, errorStruct)

  Subroutine that validates the geometry.
- subroutine, public dllovertopping::omkeervariantj (load, xcoords, ycoords, roughness, normal, npoints, givenDischarge, dikeHeight, modelFactors, output, succes, errorMessage)

  Wrapper for omkeerVariantF: get dikeHeight by given discharge.

- subroutine, public dllovertopping::omkeervariantf (load, geometryF, givenDischarge, dikeHeight, model←↩ Factors, overtopping, success, errorText, logging)

  Subroutine with omkeerVariant (get dikeHeight by given discharge)
- subroutine, public dllovertopping::setlanguage (lang)

  Subroutine that sets the language for error and validation messages.
- subroutine, public dllovertopping::getlanguage (lang)

  Subroutine that gets the language for error and validation messages.
- subroutine, public dllovertopping::versionnumber (version)

  Subroutine that delivers the version number.
- type(overtoppinggeometrytypef) function dllovertopping::geometry_c_f (geometryInput)

  Private subroutine that converts geometry from c-pointer to fortran struct.
- subroutine dllovertopping::input_j_f (x, y, roughness, normal, geometryF, modelFactorsJ, modelFactors←↩ F, loadJ, loadF)

  convert java input to Fortran input

Variables

- character, parameter dllovertopping::separationchar = char(9)

  use horizontal tab for separation

6.1.1 Detailed Description

Main entry for the dll DikesOvertopping FUNCTIONS/SUBROUTINES exported from dllOvertopping.dll:

- calcZValue
- calculateQo
- calculateQoF
- calculateQoJ
- ValidateInputC
- ValidateInputF
- ValidateInputJ
- omkeerVariantF
- omkeerVariantJ
- SetLanguage
- GetLanguage
- versionNumber

6.2 factorModuleOvertopping.f90 File Reference

This file contains a module with functions for the slope angle and influence factors.

Modules

- module factormoduleovertopping

  functions for the slope angle and influence factors

Functions/Subroutines

- subroutine, public factormoduleovertopping::calculatetanalpha (h, Hm0, z2, geometry, tanAlpha, succes, errorMessage)

  calculateTanAlpha representative slope angle
- subroutine, public factormoduleovertopping::calculategammabeta (Hm0, Tm_10, beta, gammaBeta_z, gammaBeta_o)

  calculateGammaBeta influence factor angle of wave attack
- subroutine, public factormoduleovertopping::calculategammaf (h, ksi0, ksi0Limit, gammaB, z2, geometry, gammaF, succes, errorMessage)

  calculateGammaF influence factor roughness
- subroutine, public factormoduleovertopping::calculategammab (h, Hm0, z2, geometry, gammaB, succes, errorMessage)

  calculateGammaB influence factor berms

6.2.1 Detailed Description

This file contains a module with functions for the slope angle and influence factors.

6.3 formulaModuleOvertopping.f90 File Reference

This file contains a module with the core computations for Dikes Overtopping.

Modules

- module formulamoduleovertopping

  the core computations for Dikes Overtopping

Functions/Subroutines

- subroutine, public formulamoduleovertopping::calculatewaverunup (Hm0, ksi0, ksi0Limit, gammaB, gammaF, gammaBeta, modelFactors, z2, succes, errorMessage)

  calculateWaveRunup: calculate wave runup
- subroutine, public formulamoduleovertopping::calculatewaveovertoppingdischarge (h, Hm0, tanAlpha, gammaB, gammaF, gammaBeta, ksi0, hCrest, modelFactors, Qo, succes, errorMessage)

  calculateWaveOvertoppingDischarge: calculate the wave overtopping discharge
- subroutine, public formulamoduleovertopping::calculatewavelength (Tm_10, L0)

  calculateWaveLength: calculate the wave length
- subroutine, public formulamoduleovertopping::calculatewavesteepness (Hm0, Tm_10, s0, succes, error↩ Message)

  calculateWaveSteepness: calculate the wave steepness
- subroutine, public formulamoduleovertopping::calculatebreakerparameter (tanAlpha, s0, ksi0, succes, error↩ Message)

  calculateBreakerParameter: calculate the breaker parameter
- subroutine, public formulamoduleovertopping::calculateanglewaveattack (phi, psi, beta)

  calculateAngleWaveAttack: calculate the angle of wave attack
- subroutine, public formulamoduleovertopping::calculatebreakerlimit (gammaB, ksi0Limit, succes, error↩ Message)

  calculateBreakerLimit: calculate the breaker limit
- subroutine, public formulamoduleovertopping::adjustinfluencefactors (gammaB, gammaF, gammaBeta, gammaBetaType, ksi0, ksi0Limit, succes, errorMessage)

adjustInfluenceFactors: adjust the influence factors
- subroutine formulamoduleovertopping::realrootscubicfunction (a, b, c, d, N, x, succes, errorMessage)

  realRootsCubicFunction: calculate the roots of a cubic function
- subroutine formulamoduleovertopping::rootsgeneralcubic (a, b, c, d, z, succes, errorMessage)

  rootsGeneralCubic: calculate the roots of a generic cubic function
- subroutine formulamoduleovertopping::rootsdepressedcubic (p, q, z)

  rootsDepressedCubic: calculate the roots of a depressed cubic function
- subroutine formulamoduleovertopping::cubicroots (z, roots)

  cubicRoots: calculate the roots of a cubic function
- logical function, public formulamoduleovertopping::isequalreal (x1, x2)

  isEqualReal: are two reals (almost) equal
- logical function, public formulamoduleovertopping::isequalzero (x)

  isEqualZero: is a real (almost) zero

6.3.1 Detailed Description

This file contains a module with the core computations for Dikes Overtopping.

6.4 geometryModuleOvertopping.f90 File Reference

This file contains a module with the core computations for Dikes Overtopping related to the geometry.

Modules

- module geometrymoduleovertopping

  core computations related to the geometry

Functions/Subroutines

- subroutine, public geometrymoduleovertopping::checkcrosssection (psi, nCoordinates, xCoordinates, y←Coordinates, roughnessFactors, succes, errorMessage)

  checkCrossSection: check cross section
- subroutine, public geometrymoduleovertopping::initializegeometry (psi, nCoordinates, xCoordinates, y←Coordinates, roughnessFactors, geometry, succes, errorMessage)

  initializeGeometry: initialize the geometry
- subroutine, public geometrymoduleovertopping::allocatevectorsgeometry (nCoordinates, geometry, succes, errorMessage)

  allocateVectorsGeometry: allocate the geometry vectors
- subroutine, public geometrymoduleovertopping::deallocategeometry (geometry)

  deallocateGeometry: deallocate the geometry vectors
- subroutine, public geometrymoduleovertopping::calculatesegmentslopes (geometry, succes, errorMessage)

  calculateSegmentSlopes: calculate the segment slopes
- subroutine, public geometrymoduleovertopping::determinesegmenttypes (geometry, succes, errorMessage)

  determineSegmentTypes: determine the segment types
- subroutine, public geometrymoduleovertopping::copygeometry (geometry, geometryCopy, succes, error←Message)

  copyGeometry: copy a geometry structure
- subroutine, public geometrymoduleovertopping::mergesequentialberms (geometry, geometryMergedBerms, succes, errorMessage)

  mergeSequentialBerms: merge sequential berms

- subroutine, public geometrymoduleovertopping::adjustnonhorizontalberms (geometry, geometryFlatBerms, succes, errorMessage)

  adjustNonHorizontalBerms: adjust non-horizontal berms
- subroutine, public geometrymoduleovertopping::removeberms (geometry, geometryNoBerms, succes, errorMessage)

  removeBerms: remove berms
- subroutine, public geometrymoduleovertopping::removedikesegments (geometry, index, geometryAdjusted, succes, errorMessage)

  removeDikeSegments: remove dike segments
- subroutine, public geometrymoduleovertopping::splitcrosssection (geometry, L0, NwideBerms, geometrysection←↩ B, geometrysectionF, succes, errorMessage)

  splitCrossSection: split a cross section
- subroutine, public geometrymoduleovertopping::calculatehorzlengths (geometry, yLower, yUpper, horz←↩ Lengths, succes, errorMessage)

  calculateHorzLengths: calculate horizontal lengths
- subroutine, public geometrymoduleovertopping::calculatehorzdistance (geometry, yLower, yUpper, dx, succes, errorMessage)

  calculateHorzDistance: calculate horizontal distance
- subroutine, public geometrymoduleovertopping::basicgeometrytest (geometryF, success, errorStruct)

  basicGeometryTest: test the input geometry (the adjusted geometry is checked elsewhere)

6.4.1 Detailed Description

This file contains a module with the core computations for Dikes Overtopping related to the geometry.

6.5 mainModuleOvertopping.f90 File Reference

This file contains a module with the core computations for Dikes Overtopping.

Modules

- module mainmoduleovertopping

  core computations for Dikes Overtopping

Functions/Subroutines

- subroutine, public mainmoduleovertopping::calculateovertopping (geometry, load, modelFactors, overtopping, logging, succes, errorMessage)

  calculateOvertopping: calculate the overtopping
- subroutine, public mainmoduleovertopping::calculateovertoppingsection (geometry, h, Hm0, Tm_10, L0, gammaBeta_z, gammaBeta_o, modelFactors, overtopping, logging, succes, errorMessage)

  calculateOvertoppingSection: calculate the overtopping for a section
- subroutine, public mainmoduleovertopping::calculatewaveovertopping (geometry, h, Hm0, Tm_10, z2, gammaBeta_o, modelFactors, Qo, succes, errorMessage)

  calculateWaveOvertopping: calculate wave overtopping
- subroutine mainmoduleovertopping::calculateovertoppingnegativefreeboard (load, geometry, overtopping, succes, errorMessage)

  calculateOvertoppingNegativeFreeboard: calculate overtopping in case of negative freeboard
- subroutine, public mainmoduleovertopping::interpolateresultssections (geometry, L0, NwideBerms, overtoppingB, overtoppingF, overtopping, succes, errorMessage)

interpolateResultsSections: interpolate results for split cross sections
- subroutine, public mainmoduleovertopping::checkinputdata (geometry, load, modelFactors, succes, error↩ Message)

  checkInputdata: check the input data
- subroutine, public mainmoduleovertopping::checkmodelfactors (modelFactors, dimErrMessage, error↩ Messages, ierr)

  checkModelFactors: check the input data

6.5.1 Detailed Description

This file contains a module with the core computations for Dikes Overtopping.

6.6 ModuleLogging.f90 File Reference

Module for steering the extra logging.

Data Types

- type modulelogging::tlogging

  TLogging: structure for steering the logging.

Modules

- module modulelogging

  steering the extra logging

Variables

- integer, parameter modulelogging::maxfilenamelength = 256

  maximum length of filename

6.6.1 Detailed Description

Module for steering the extra logging.

6.7 omkeerVariantModule.f90 File Reference

This file contains the omkeerVariant.

Data Types

- type omkeervariantmodule::tomkeer

Modules

- module omkeervariantmodule

  Module for the 'omkeerVariant'.

Functions/Subroutines

- subroutine, public omkeervariantmodule::iteratetogivendischarge (load, geometryF, givenDischarge, dike↩ Height, modelFactors, overtopping, success, errorText, logging)

  Subroutine with omkeerVariant.
- subroutine omkeervariantmodule::iteratetogivendischargevalidprofile (load, geometry, givenDischarge, dike↩ Height, modelFactors, overtopping, logging, success, errorText)

  Subroutine with iterateToGivenDischarge, with already checked profile.
- subroutine omkeervariantmodule::checkifonberm (geometry, load, modelfactors, overtopping, given↩ Discharge, dikeHeight, omkeerProps, logging, iUp, iLow, dis1, dis2, minDikeHeight, maxDikeHeight, found↩ Value, success, errorText)

Variables

- real(kind=wp), parameter omkeervariantmodule::toldischarge = 1d-3
- real(kind=wp), parameter omkeervariantmodule::toldikeheight = 1d-3
- real(kind=wp), parameter omkeervariantmodule::minzberm = 0.1_wp

6.7.1 Detailed Description

This file contains the omkeerVariant.

6.8 overtoppingInterface.f90 File Reference

This file contains the parameters and types (structs) as part of the interface to and from dllOvertopping.

Data Types

- type overtoppinginterface::tpprofilecoordinate
- type overtoppinginterface::overtoppinggeometrytype
- type overtoppinginterface::overtoppinggeometrytypef

Modules

- module overtoppinginterface

  Module for the interface of dllOvertopping.

Variables

- integer, parameter, public overtoppinginterface::varmodelfactorcriticalovertopping = 8

  Model factor critical overtopping.

6.8.1 Detailed Description

This file contains the parameters and types (structs) as part of the interface to and from dllOvertopping.

6.9 OvertoppingMessages.f90 File Reference

This file contains the messages in the overtopping dll, in Dutch or English.

Modules

- module overtoppingmessages

  Module for the messages in the overtopping dll, in Dutch or English.

Functions/Subroutines

- subroutine overtoppingmessages::setlanguage (lang)

  IDs for the strings in this module:
- subroutine overtoppingmessages::getlanguage (lang)

  Subroutine that gets the language for error and validation messages.
- character(len=maxmsg) function overtoppingmessages::getovertoppingmessage (ID)

  Subroutine that returns a message with the corresponding ID in the current language.
- character(len=maxmsg) function overtoppingmessages::getovertoppingformat (ID)

  Subroutine that returns a Fortran format string with the corresponding ID in the current language.
- character(len=maxpar) function overtoppingmessages::getovertoppingparameter (ID)

  Subroutine that returns the name of an input parameter with the corresponding ID in the current language.
- subroutine overtoppingmessages::getmsg_calculategammaftolow (message)
- subroutine overtoppingmessages::getmsg_calculategammaftohigh (message)
- subroutine overtoppingmessages::getmsg_calc_influence_roughness (message)
- subroutine overtoppingmessages::getmsg_first_segment_berm (message)
- subroutine overtoppingmessages::getmsg_last_segment_berm (message)
- subroutine overtoppingmessages::getformattoomanyberms (cfmt)
- subroutine overtoppingmessages::getmsgremovenonhorizontalberm (message)

Variables

- integer, parameter, private overtoppingmessages::maxmsg = 128
- integer, parameter, private overtoppingmessages::maxpar =32
- character(len=2), private overtoppingmessages::language = 'NL'

  default : Dutch

6.9.1 Detailed Description

This file contains the messages in the overtopping dll, in Dutch or English.

6.10 typeDefinitionsOvertopping.f90 File Reference

This file contains a module with the type definitions for Dikes Overtopping.

Data Types

- type typedefinitionsovertopping::tpgeometry

  tpGeometry: structure with geometry data
- type typedefinitionsovertopping::tpload

  tpLoad: structure with load parameters
- type typedefinitionsovertopping::tpovertoppinginput

  OvertoppingModelFactors: C-structure with model factors.
- type typedefinitionsovertopping::tpovertopping

  tpOvertopping: structure with overtopping results

Modules

- module typedefinitionsovertopping

  type definitions for Dikes Overtopping

Variables

- real(kind=wp), parameter typedefinitionsovertopping::frunup1 = 1.65_wp
- real(kind=wp), parameter typedefinitionsovertopping::frunup2 = 4.00_wp
- real(kind=wp), parameter typedefinitionsovertopping::frunup3 = 1.50_wp
- real(kind=wp), parameter typedefinitionsovertopping::xdiff_min = 2.0d-2

  minimal value distance between x-coordinates (m)
- real(kind=wp), parameter typedefinitionsovertopping::margindiff = 1.0d-14

  margin for minimal distance (m)
- real(kind=wp), parameter typedefinitionsovertopping::berm_min = 0.0d0

  minimal value gradient berm segment
- real(kind=wp), parameter typedefinitionsovertopping::berm_max = 1.0d0/15

  maximal value gradient berm segment
- real(kind=wp), parameter typedefinitionsovertopping::slope_min = 1.0d0/8

  minimal value gradient slope segment
- real(kind=wp), parameter typedefinitionsovertopping::slope_max = 1.0d0

  maximal value gradient slope segment
- real(kind=wp), parameter typedefinitionsovertopping::margingrad = 0.0025d0

  margin for minimal and maximal gradients
- real(kind=wp), parameter typedefinitionsovertopping::rfactor_min = 0.5d0

  minimal value roughness factor dike segments
- real(kind=wp), parameter typedefinitionsovertopping::rfactor_max = 1.0d0

  maximal value roughness factor dike segments
- real(kind=wp), parameter typedefinitionsovertopping::mz2_min = 0.0d0

  minimal value model factor of 2% runup height
- real(kind=wp), parameter typedefinitionsovertopping::mz2_max = huge(mz2_max)

  maximal value model factor of 2% runup height
- real(kind=wp), parameter typedefinitionsovertopping::fb_min = 0.0d0

  minimal value model factor for breaking waves
- real(kind=wp), parameter typedefinitionsovertopping::fb_max = huge(fB_max)

  maximal value model factor for breaking waves
- real(kind=wp), parameter typedefinitionsovertopping::fn_min = 0.0d0

  minimal value model factor for non-breaking waves
- real(kind=wp), parameter typedefinitionsovertopping::fn_max = huge(fN_max)

  maximal value model factor for non-breaking waves
- real(kind=wp), parameter typedefinitionsovertopping::fs_min = 0.0d0

  minimal value model factor for shallow waves
- real(kind=wp), parameter typedefinitionsovertopping::fs_max = huge(fS_max)

  maximal value model factor for shallow waves
- real(kind=wp), parameter typedefinitionsovertopping::foreshore_min = 0.3d0

  minimal value reduction factor foreshore
- real(kind=wp), parameter typedefinitionsovertopping::foreshore_max = 1.0d0

  maximal value reduction factor foreshore
- integer, parameter typedefinitionsovertopping::z2_iter_max1 = 49

  maximal number of iterations for calculation z2 part 1
- integer, parameter typedefinitionsovertopping::z2_iter_max2 = 70

  maximal number of iterations for calculation z2 part 1 & 2
- real(kind=wp), parameter typedefinitionsovertopping::z2_margin = 0.001d0

  margin for convergence criterium calculation z2

6.10.1 Detailed Description

This file contains a module with the type definitions for Dikes Overtopping.

6.11 waveRunup.f90 File Reference

This file contains a module with the iteration procedure for 2% wave runup.

Modules

- module waverunup

  Iteration procedure for 2% wave runup.

Functions/Subroutines

- subroutine, public waverunup::iterationwaverunup (geometry, h, Hm0, Tm_10, gammaBeta_z, modelFactors, z2, logging, succes, errorMessage)

  iterationWaveRunup: iteration for the wave runup
- real(kind=wp) function waverunup::innercalculation (geometry, h, Hm0, gammaBeta_z, modelFactors, z2, s0, geometryFlatBerms, succes, errorMessage)

  innerCalculation: inner calculation for the wave runup
- real(kind=wp) function waverunup::determinestartingvalue (i, relaxationFactor, z2_start, z2_end, Hm0)

  determineStartingValue: helper function to find a start value for z2
- integer function waverunup::findsmallestresidu (z2_start, z2_end, n)

  findSmallestResidu: helper function to find the smallest residu
- subroutine waverunup::convergedwithresidu (z2_start, z2_end, logging)

  convergedWithResidu: helper function to handle convergence with a higher residu than expected if logging is enabled, it writes a small message to the logfile

6.11.1 Detailed Description

This file contains a module with the iteration procedure for 2% wave runup.

6.12 zFunctionsOvertopping.f90 File Reference

This file contains the limit state functions for wave overtopping within VTV.

Modules

- module zfunctionsovertopping

  Module for the Limit State Functions (Z-functions) for wave overtopping.

Functions/Subroutines

- subroutine, public zfunctionsovertopping::calculateqorto (dikeHeight, modelFactors, overtopping, load, geometry, logging, succes, errorMessage)

  Subroutine to calculate the overtopping discharge with the Overtopping dll.
- subroutine, public zfunctionsovertopping::profileinstructure (nrCoordinates, xcoordinates, ycoordinates, dikeHeight, nrCoordsAdjusted, xCoordsAdjusted, zCoordsAdjusted, succes, errorMessage)

Subroutine to fill the profile in a structure and call the adjustment function of the profile due to a desired dike height.

- subroutine zfunctionsovertopping::adjustprofile (nrCoordinates, coordinates, dikeHeight, nrCoordsAdjusted, xCoordsAdjusted, zCoordsAdjusted, succes, errorMessage)

  Subroutine adjust the profile due to a desired dike height.

- real(kind=wp) function, public zfunctionsovertopping::zfunclogratios (qo, qc, mqo, mqc, success, error↩ Message)

  Routine to compute the limit state value by using the logs of the overtopping discharges (computed and desired)

6.12.1 Detailed Description

This file contains the limit state functions for wave overtopping within VTV.

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