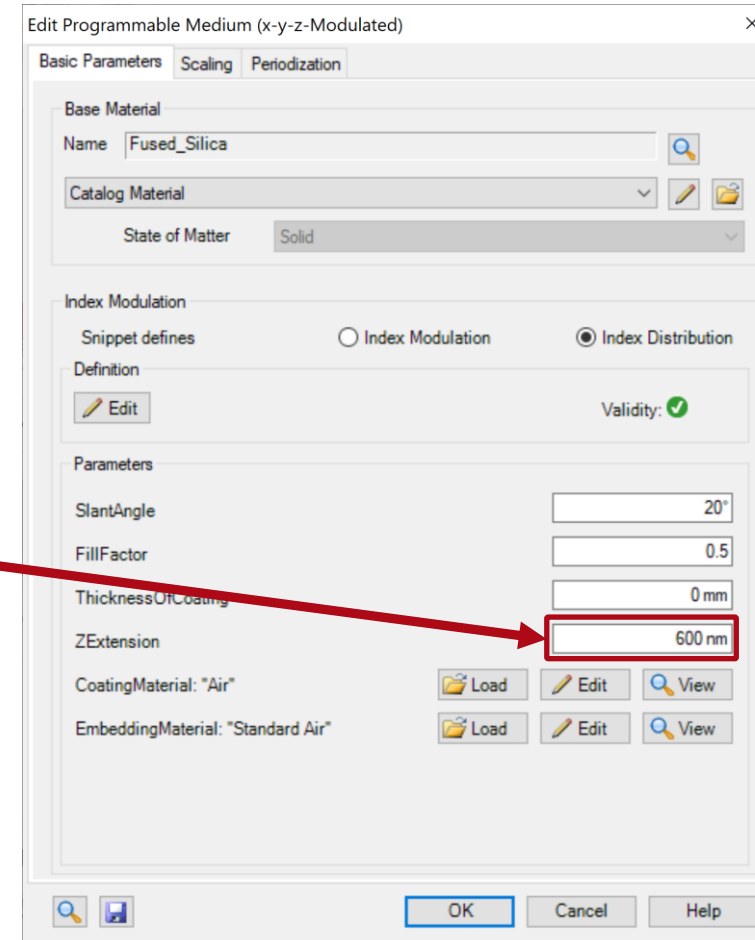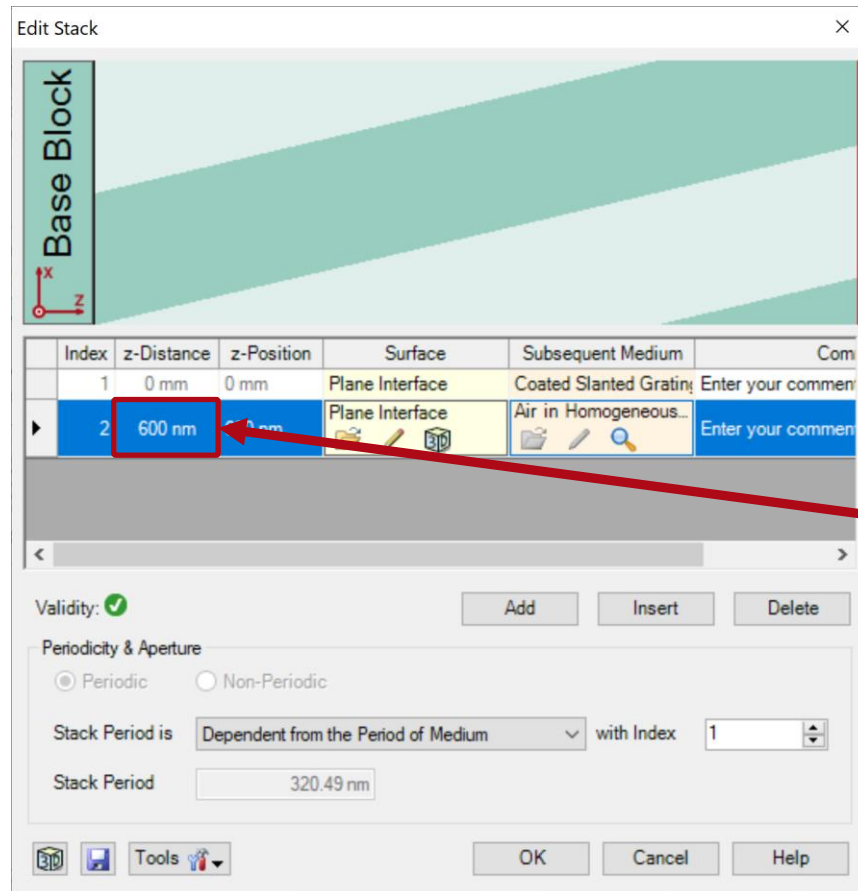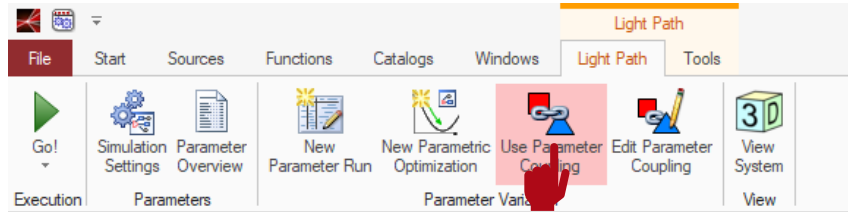# Coupling of Parameters in VirtualLab Fusion

Abstract

The Parameter Coupling feature of VirtualLab Fusion allows users to link together different parameters in a system. The values can be used to re-calculate those of other parameters, so that a certain relationship between them is automatically maintained. Hence, this feature allows the user to instate complex dependencies for these parameters. For instance, in this example we use the Parameter Coupling to ensure that the z extension of a user-programmed slanted grating medium coincides with the thickness of the structured layer where it is contained.
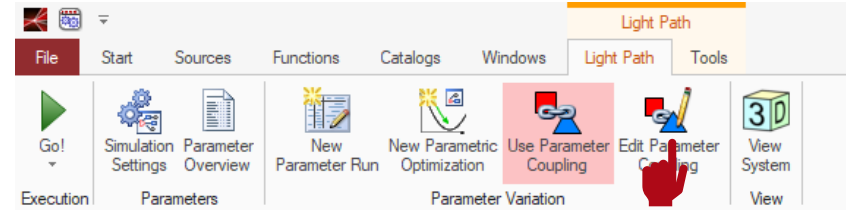
Task

We wish to link two parameters of an optical system, so that they automatically take the same value. For this purpose, VirtualLab's *Parameter Coupling* feature is used.
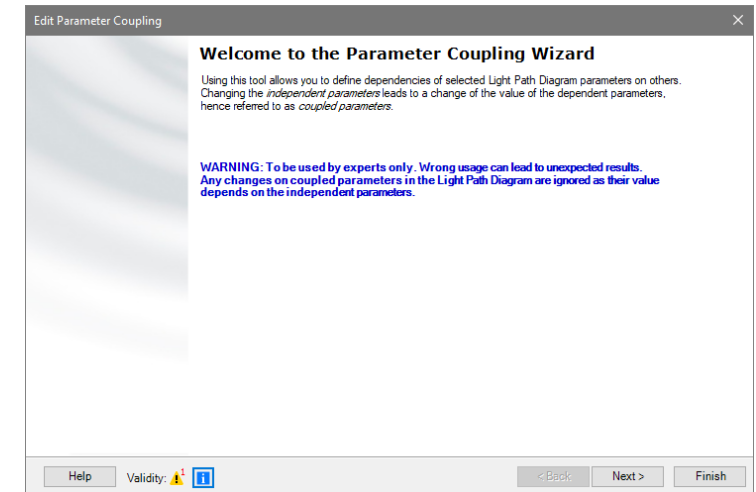
Set Up Parameter Coupling

In order to use the parameter coupling feature of VirtualLab Fusion activate the option "*Use Parameter Coupling*" for the optical setup in question.

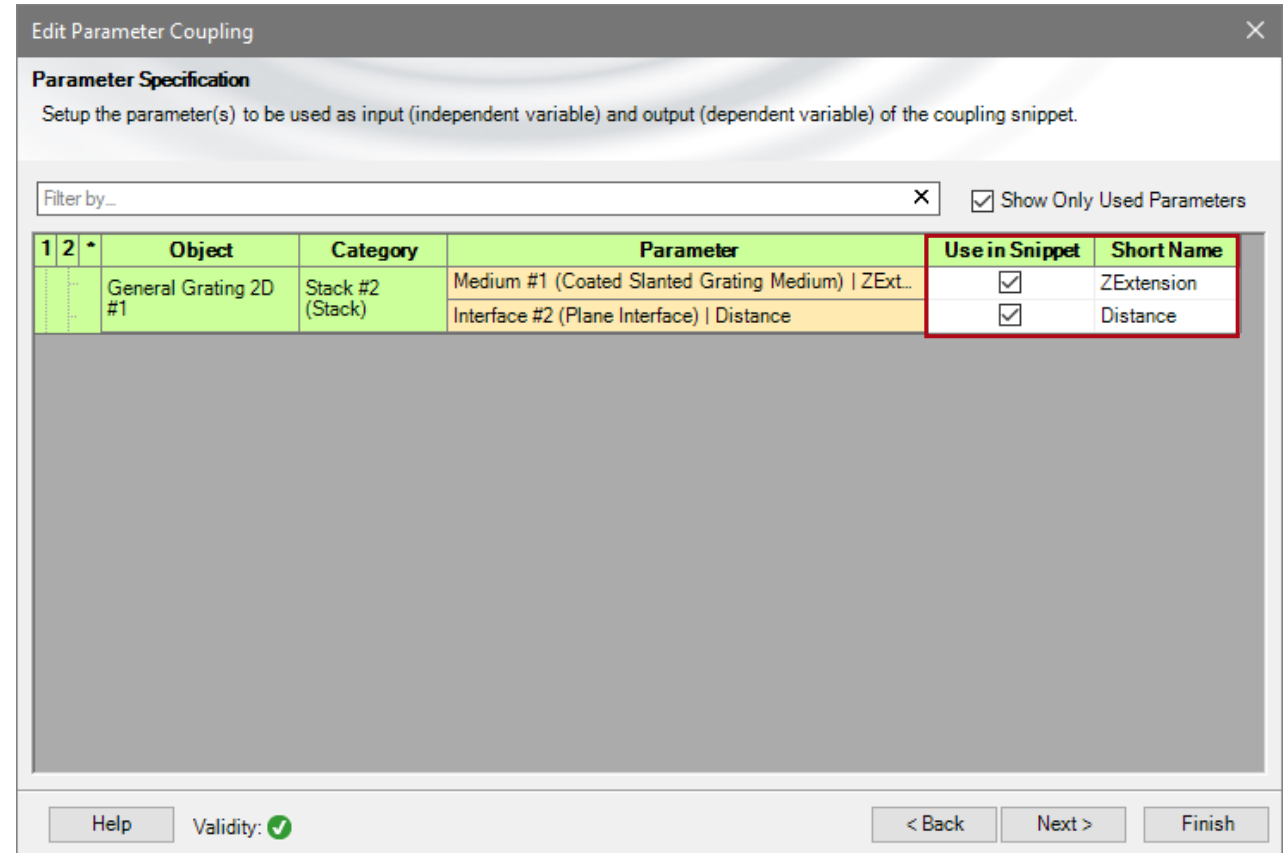Afterwards, the "*Edit Parameter Coupling*" button is available.

Clicking on the "*Edit Parameter Coupling*" button causes the parameter coupling wizard to appear.

Choose Parameters Involved

By clicking "*Next*", a table is shown which contains all parameters of the current optical setup.

Please select all the parameters which are relevant for the coupling and necessary calculation. For instance, the parameters "*ZExtension*" and "*Distance*" are chosen in this case.
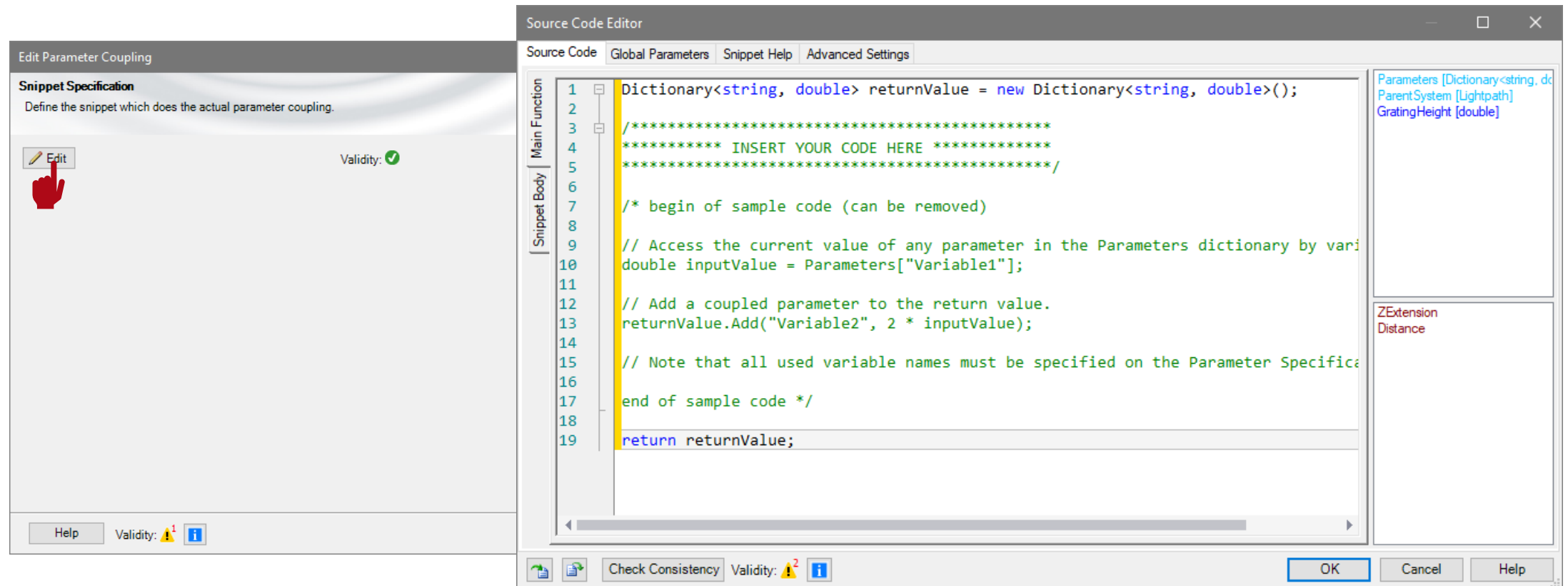
Configure the Coupling of the Parameters

After choosing the parameters, the snippet which controls the coupling has to be implemented.
By clicking on "*Edit*" the source code editor opens.

Configure the Coupling of Parameters

The source code tab contains three areas:

1 the source code (center area)

2 global variables/parameters (top right)

**3** chosen system parameters (bottom right)
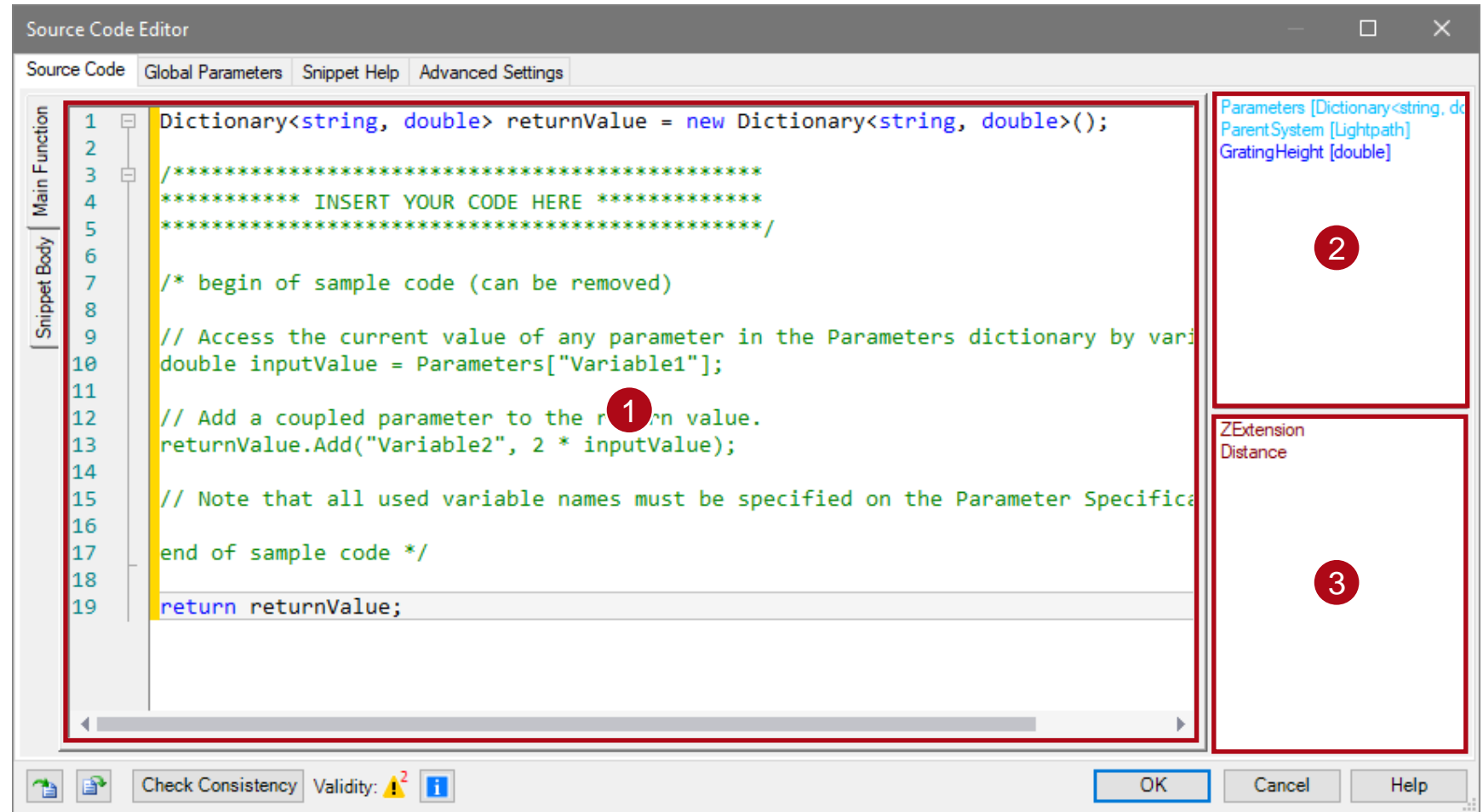
General Example of Parameter Coupling

- In general, the chosen parameters have to be read from the dictionary and saved to a variable (line 4).

- Afterwards, that value can be used as output for another parameter, or play a role in its calculation, e.g. be doubled (line 7).
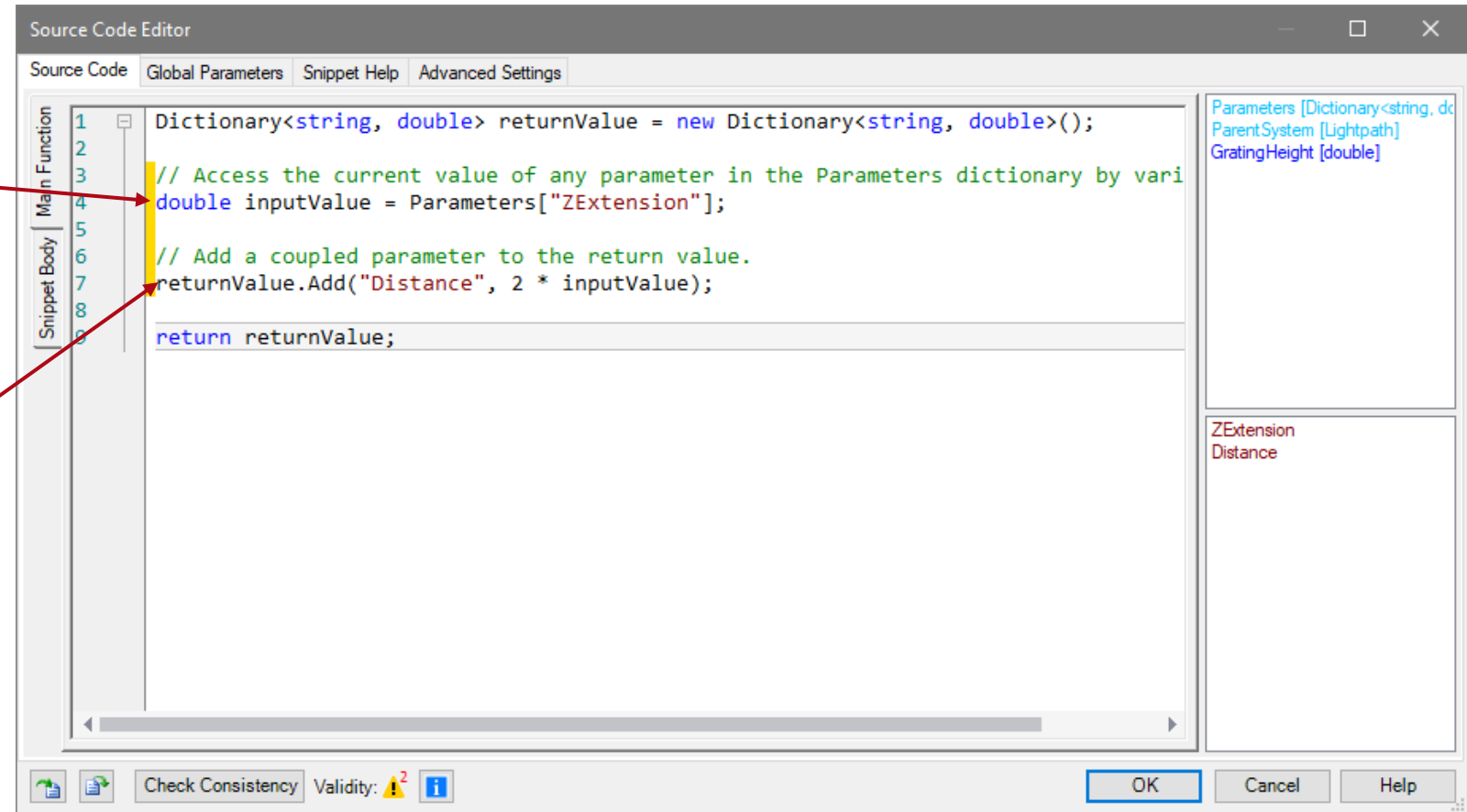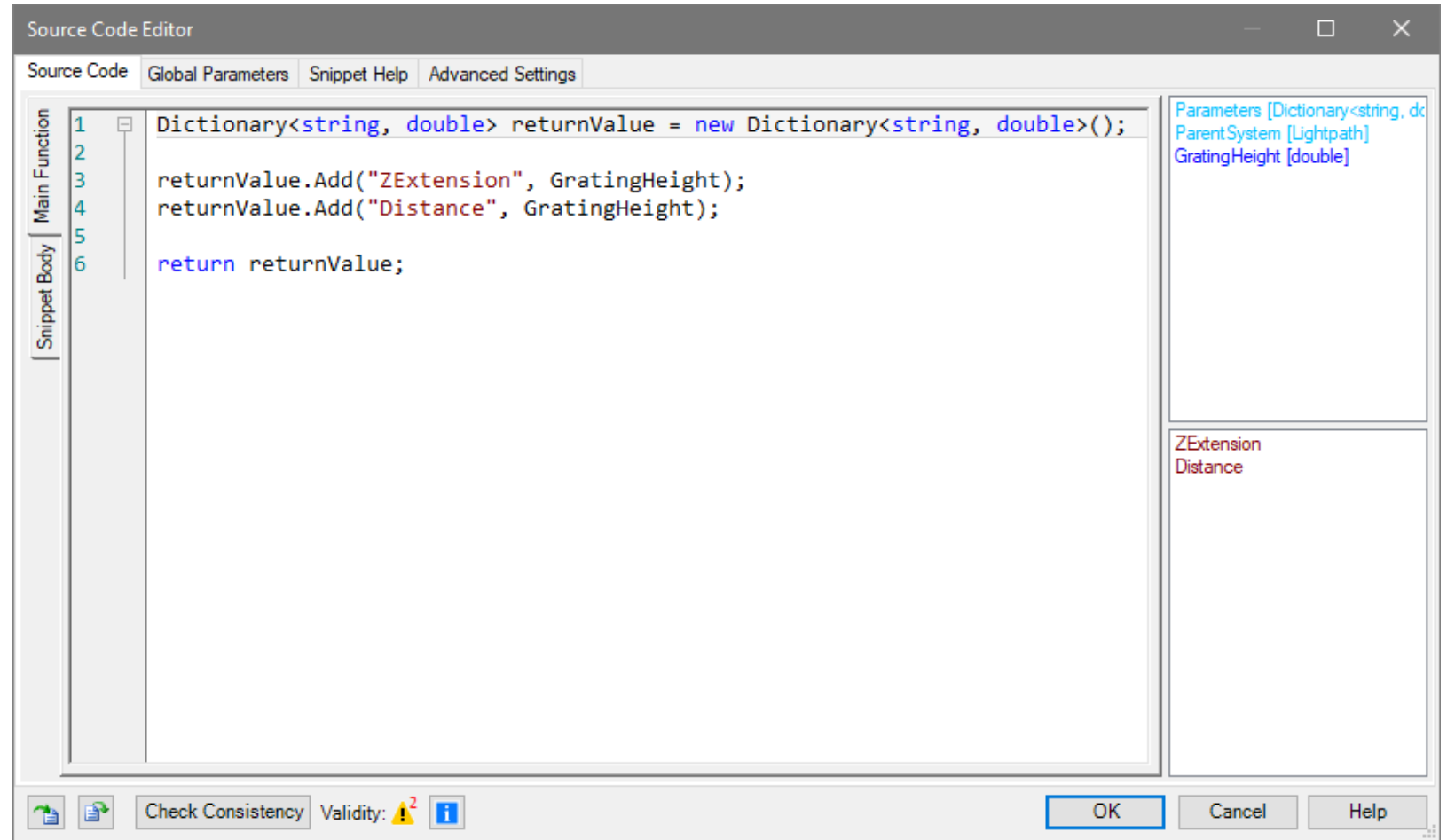
Definition of Global Parameters

- In this particular example, it is helpful to define a new global variable, which later appears on the parameter coupling window.

- This can be done in the "*Global Parameters*" tab.

- The variable can be of different types and have different physical quantities attached.
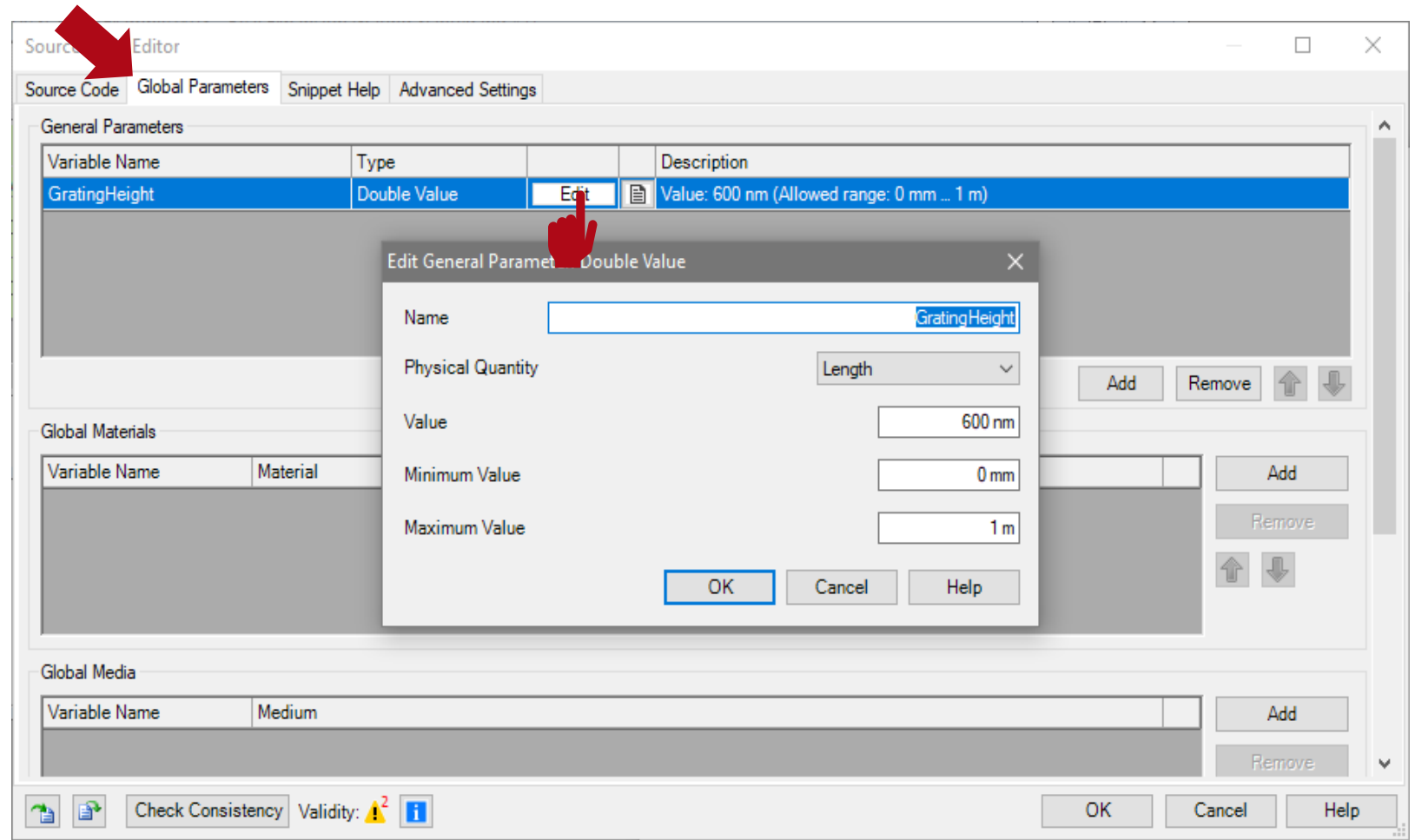
Particular Example of Parameter Coupling

- In this example, the global variable is used to return its value to both chosen parameters of the system.

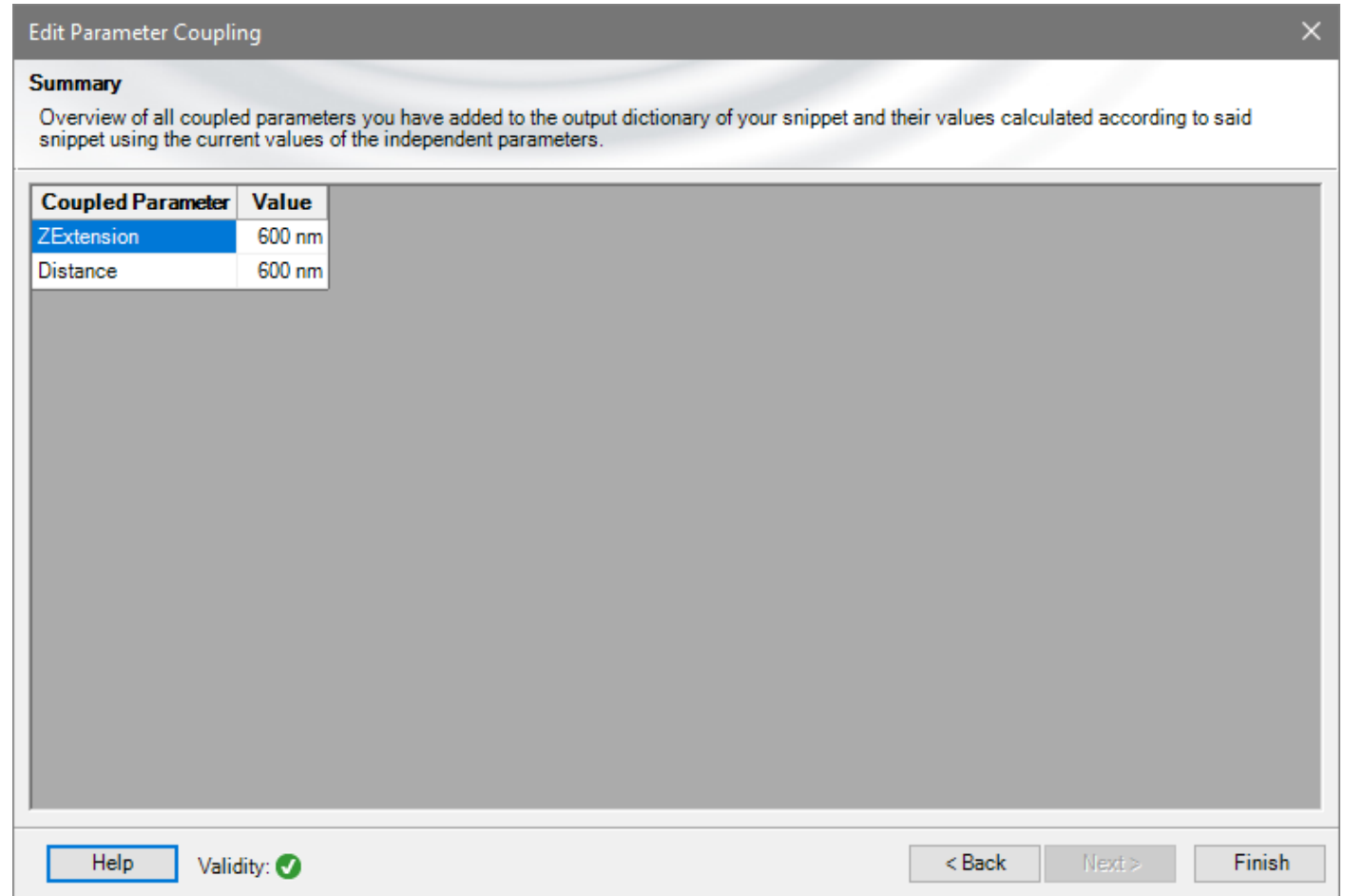- Thus, no parameter has to be read from the dictionary or re-calculated.

Source Code Editor

Source Code | Global Parameters | Snippet Help | Advanced Settings

```
1  Dictionary<string, double> returnValue = new Dictionary<string, double>();
2
3  returnValue.Add("ZExtension", GratingHeight);
4  returnValue.Add("Distance", GratingHeight);
5
6  return returnValue;
```

Parameters [Dictionary<string, do
ParentSystem [Lightpath]
GratingHeight [double]

ZExtension
Distance

Check Consistency   Validity: OK   Cancel   Help

Particular Example of Parameter Coupling

- After closing the source code editor, the defined global variable "*GratingHeight*" appears.

- When working with the system later on, the user will only be able to modify the value of this variable, which will in turn automatically affect the value of the system parameters. Trying to modify the value of the parameters themselves will have no effect.

Final Check of Implemented Parameter Coupling

- On the last page of the wizard, the returned parameters and values can be checked.

Document Information

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