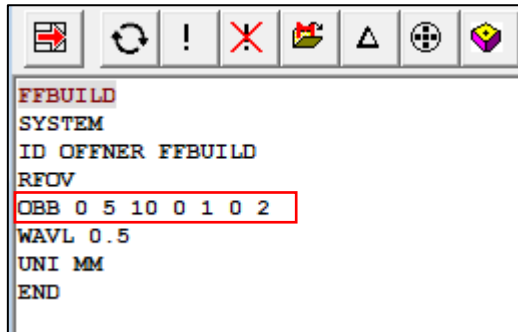# Rectangular Object in FFBUILD

To define a rectangular object for FFBUILD, you will need to specify the Y and X dimensions of the object using the UYP0 and UXP0 parameters in the OBB command:

OBB UMP0 UPP0 YMP1 [YP1 UXP0 XP1 XMP1]

In the example shown below, I declare
- An object at infinity (OBB)
- The angular extent of this object is 5 and 1 degree in the Y- and X-dimension (YPP0 and UXP0), respectively
- We need to specify YMP1 and XMP1 to define the entrance pupil size and shape. I assume it also a rectangular pupil with YMP1 = 10 and XMP1 is scaled proportionally to 2
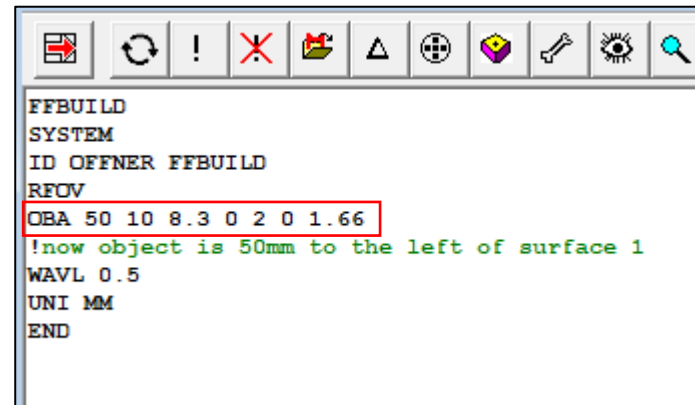

Similarly, if you want to define a rectangular object at finite distance, you can use OBA. Here I define:
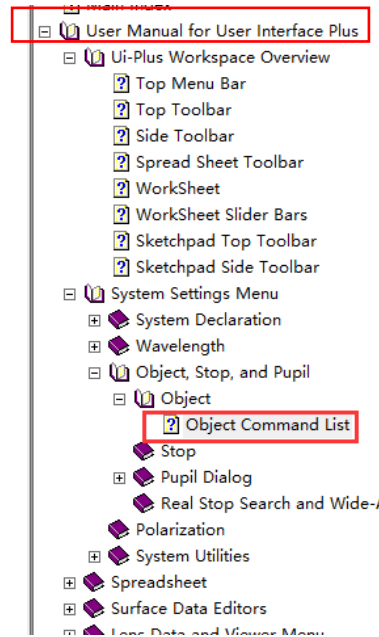- An object that is 50 mm to the left of surface 1 (OBA).
- The object heights are 10 mm in Y and 2 mm in X
- The entrance pupil (beam size at the 1st surface) is 8.3mm in Y and 1.66mm in X (again, Y and X dimensions are scaled proportionally to the FOV in Y and X)

Explanation of the object command parameters can be found in the Object section of the User Interface Plus Help Manual:

Object Command List

Here is a complete list of all the object types and the commands to define them in SYNOPSYS™:

Finite object (linear)	OBA TH0 YP0 YMP1 [YP1 XP0 XP1 XMP1]
Infinite object (angular)	OBB UMP0 UPP0 YMP1 [YP1 UXP0 XP1 XMP1]
Finite object (angular)	OBC TH0 UPP0 YMP1 [YP1 UXP0 XP1 XMP1] (see Note below)
Wide-angle (angular)	OBD TH0 UPP0 YMP1 [YP1 UXP0 XP1 XMP1] (see Note below)
Fast object (linear)	OBF TH0 YP0 YMP1 [YP1 XP0 XP1 XMP1]
GAUSSIAN BEAM	OBG WAIST [RBS [WAISTx] [RBSx] [M2]]]
ILLUMINATION ARRAY	OBI TH0 YP0 ANGLE XS YS NX NY
LAMBERTIAN	OBL TH0 YP0 ANGLE [XP0]
WAVEGUIDE OBJECT	OBW SEMIAP MULTIPLIER

The meaning of the parameters are summarized in the Table below and illustrated in the following pictures:

TH0	object distance from surface 1, positive if to the left
YP0	object height, in lens units. Must be non-zero
YMP1	axial marginal ray height on surface 1 vertex plane
YP1	principal ray height on surface 1 vertex plane
XP0	object height along X-axis, in lens units. Zero is permitted for XP0, but not for YP0.
XP1	principal ray height on surface 1 X-axis, from the object at XP0 or UXP0
XMP1	X-dimension of axial marginal ray
UMP0	paraxial marginal ray angle in degrees. Used chiefly for infinite conjugate, for which UMP0 = 0.
UPP0	field angle in degrees of object on Y-axis, measured at the vertex of surface 1. The value must be non-zero.
UXP0	paraxial chief ray angle in degrees for object on X-axis, measured at the vertex of surface 1
ANGLE	specifies the semi-angle of light from a Lambertian object