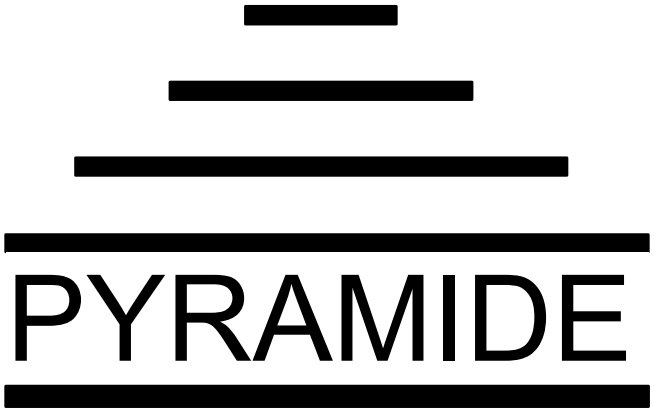


PYRAMIDE

TRIDIM 3

For SMSQ/E Systems

Rue du Ruisseau 75018 Paris Tel 42.54.39.67

Tridim 3 is a decompilation of Tridim version 2, by Michel Meunier. And is copyright of Pyramide Software. G_RATIO, used correct graphic drawing is by Jens Wildgruber.

A note about screen pixels

There are two differently shaped screen pixels in QL's and QL emulators.

The original QL and Qemulator use rectangular screen pixels. QPC2 uses square screen pixels.

If you find that circles are not drawn correctly (flattened or squashed) you may need to change the value of a variable in both Tridim and the Manipulation program.

You will find the variable named 'g_ratio' near the beginning of the programs.

Use a value of 0 for the original Black Box QL and Qemulator.
And a value of 1 for QPC2.

Martin Head Feb 2018

TRIDIM Version 3.00

Tridim is software for the creation and representation of objects in three dimensions.

This version is intended for use with SMSQ/E systems. Tridim 3 is a SBASIC that may be Loaded and RUN. After RUNning the program, in the top window a first menu representing the main functions of TRIDIM will appear. It is in this window that all the important menus will appear. The bottom window is used to enter data to create an object, or to represent an object. To select one of the functions available, simply press the first letter of the function. To exit a secondary menu and return to the main menu, press ESC.

1 CREATE

The CREATE command is the main object creation command. It is through this command option that you must go through systematically to create a new object. Indeed the choice of CREATE erases the object currently stored in memory. Once this option is selected a new menu appears. It is has six new options. Let's look at the possibilities of selecting CREATE.

1.1 CREATING CHAINS

This option is the simplest, indeed it is enough to simply give the coordinates of a sequence of points (maximum 15). During REPRESENT these points will be linked together. The coordinates relate to a conventional orthonormal index OXYZ (see FIG. 1). The number of 15 points per string may seem insufficient, but you should know that you can create up to 200 different strings. The first thing that you are asked for is the number of points on the string you want to create. Then you enter the coordinates of each of the points one after the other. Just type the requested values, while making corrections with the up and down arrow keys, finally validate by pressing the ESC key. Then the program asks if there is

an error. In this case, the string is exited and you must re-enter it by the same method as before. To add parts to your object, select the Another Chain option. Otherwise, by pressing ESC you will return to the main menu.

1.2 CIRCLE

This option creates a circle. Now a circle is defined by its centre, its axis and its radius. So the program asks you for these elements. First, it is co-ordinated from the centre of the circle: then its axis: for this it needs the azimuth which is the angle in degrees between the axis OX and the projection of the axis of the circle on the plane OXY: and the site which is the angle in degrees between the plane OXY and the axis of the circle (see FIG. 2). Lastly, it is no more than the introduction of the radius of the circle. This circle thus created uses an entire string.

Once the circle is completed, You are returned to the CREATE menu immediately.

1.3 CONNECT CIRCLES

This function is one of TRIDIM's most powerful, because it allows you to draw a series of circles and then connect them together. Thus the fuselage of the CONCORDE or the GLASS were created entirely with the aid of this function.

It must be known that all these circles have an axis which is parallel to the axis OX. And that for each circle the means of determining its axis is to give the coordinates of the intersection of this axis with the plane OYZ (see FIG. 3).

The program asks you first for the number of meridians, that is to say the number of segments that will connect the circles. Then you must enter the coordinates of the trace of the axis of the first circle, then its abscissa (ie the distance to the plane OYZ), and finally the radius. Once this first circle is defined, the program asks you if you

want another circle, and then if you keep the same trace for the next circle. The following circles are defined in the same way as the first circle. When you reach the number of circles required, you return to the menu of CREATE by answering by N to the question: "Another?". The number of chains used is equal to the sum of the number of circles and the number of meridians.

For an object like a glass, it appears that all the traces are the same. On the other hand, for the nose of CONCORDE. The trace is distinct for each one defining it.

1.4 LINKING CHAINS

The LINKING CHAINS function is very similar to the CONNECTING CIRCLES function. The first thing to do is to give the constant number of points that will be in each of the chains to be connected. Then you must enter the coordinates of the points of the first string. Then if there is an error you can correct by typing Y to the question: "An error?"; In this case re-enter the coordinates of the points of the chain. You can then choose to quit or continue with another string, The process then being the same as for the first string. Once you have finished entering the string series, answer by N when the program asks you if you want another string. You will then return to the CREATE menu. The number of strings used is then equal to the number of points per string plus the number of strings entered. To see the example of the use of CONNECT, look at the CONCORDE wings that have been realized with this option, in fact 7 profiles have been entered and then linked by this option (see FIG. 4).

1.5 CIRCLE ARCS

This option, as the name suggests, allows you to draw circular arcs. To determine this arc, the program first asks for the coordinates or centre of the circle that contains the arc of a circle. Then the ray of this same circle. And finally the axis of this circle. The axis can only be one of the 3 principal axes, ie: OX, OY or OZ. To choose the axis, simply type: X, Y or Z. To finish determining the arc of the circle, the angle in degrees of the starting point of the arc of the circle must be given, and the angle in degrees of the point of arrival of the arc of circle (see FIG. 5).

2 EDIT

When you have entered an object it is possible that there may be an error on one of the points, or on one of the strings. This is why the EDIT option was created. Once you select EDIT, a new menu appears. It gives you the choice between editing a point, a complete string or a view. To select one of these two options simply press the first letter i.e. P, C or V.

OPTION POINT:

With this option you can change the coordinates of a single point. To read it, it is enough to give the index of the chain and the index of the point, that is to say the number of the chain containing the point, and the number of the point in the chain. If your point is in the first string, for example, its string index will be 1; and the number of chains are in the order of their creation. The principle of the point index is the menu, in fact if the point is the first one in a given string its index of point will be 1. Once you have entered the 2 indices of a point, the program gives you the current coordinates, and asks for the new coordinates. When you have finished renaming the new coordinates, the program asks if you want to change another point. If not, you then return to the main menu. Otherwise, the program starts the sequence menu as before.

CHAIN OPTION:

With this option you can completely change a string. The first thing to do, is to give the index of the string to be changed: this index is the same as that defined in the POINT option. Once the index is entered, the program asks you the same as CREATE. All you have to do is choose the type of string you want to create. You can also rewrite it as much as you want (within the limit of the possible 200). When you create a string, you re-write over the old one. When you are finished, the program asks if you want to delete the next chain or keep it. Whichever you choose, the program returns to the main menu.

VIEW OPTION:

With this option you can display the contents of a string. First is displayed the number of chains an object is formed of, and you can select the index of the chain to start with. Press ESC when ready to continue. The Chain number, Point number, and coordinates are displayed. You may cycle through the list with the up and down cursor keys.

3 ADD

This option is very useful, indeed when you have created an object and you realize that it is not complete, It is necessary to add strings to it. If you have left the CREATE menu, you can not reselect the CREATE option, because automatically when CREATE is selected, the chain monitor is reset to zero and the already created object is destroyed. So it is essential to have an option that offers you the same possibilities as CREATE, without losing the chains already introduced. This is the case of ADD. In fact, when you choose this option, the program gives you the same menu as CREATE, but without resetting the chain counter, you can then freely add strings to your object, in the same way as if you were in the option CREATE.

4 TRANSFORM

When you have finished creating your object, you may find it is not large enough, or if you created something like a glass using the CONNECT CIRCLES option, you need to straighten it. For all these operations consisting of transforming an object, not adding or deleting chains this option will quickly become indispensable.

So when you select TRANSFORM, a new menu appears. It is comprised of 6 options, which we will look at. To select one of these options, simply press the first letter. When you have finished using one of these options, you can either choose a new one by pressing the corresponding key or return to the main menu by pressing ESC.

4.1 TRANSLATION

Your object will be created at a position in relation to the centre of the marker. Indeed if you want to use the option MERGE as we will see later it is preferable that the objects do not overlap So to avoid this, you have to move the object. The program asks you the "translation vector". The translation vector is the displacement of the object by 3 axes. For example, you want to advance your object from 100 on the OX axis, move it from 500 on the OY axis and descend it 150 on the OZ axis: the coordinates of the translation vector will then be 100, -500 and -150 As you see it's very simple. When you have finished entering the coordinates, the program performs the translation and then returns directly to the TRANSFORM menu.

4.2 ROTATION

As you have seen, using CONNECTING CIRCLES, the axis of these circles are parallel to the axis OX. This may be a problem if you create a glass, as you would surely like to see it standing, rather than laying down. Therefore, in order to remedy this problem, it is necessary to straighten the glass by means of a rotation about an axis parallel to the axis OY.

This is one of the uses of the ROTATE option. But this option allows you to rotate around the 3 main axes: OX, OY and OZ.

The first thing the program asks is to precisely to select one these 3 axes. To do this, simply type X, Y or Z: if you type ESC, you will return to the TRANSFORM menu. Once the axis has been selected, the axis of rotation must be indicated. The coordinate principle of the trace is the same as for the CIRCLE RELAY option. It remains only to give the value of the rotation, this value being able to be positive as well as negative. The positive sense is given by the reference, but the simplest is to consult the figures 6.a, 6.b and 6.c.

Once you have rotated your rotation, you can reselect another rotation by pressing the corresponding key. However, pressing ESC returns you to the TRANSFORM menu.

4.3 SYMMETRY

Suppose you have to create an aeroplane. When you have completed one of the wings, it is very practical to use SYMMETRY, to create the other wing: it would be a waste of time to re-enter the coordinates to create the other wing.

SYMMETRY makes it possible to make the symmetries with respect to the 3 main planes, which are: OXY, OYZ and OXZ. The program then asks you simply to select one of the 3 planes, pressing X for OYZ, Y for OXZ and Z for OXY. The program then performs the symmetry and automatically reverts to the TRANSFORM menu

4.4 AFFINITY

An affinity allows you to stretch or contract an object along one of the usual principal axes: OX, OY or OZ. For example, if you have created one that seems too short and not enough tapered. With the AFFINITY option, it is enough to give the axis of the plane (which must be one of the 3 main axes), and to give a multiplier coefficient called coefficient of the affinity.

The use is therefore simple, it is enough to give the axis of the affinity by typing X, Y or Z. Then to give the coefficient of the affinity If you give, for example, 2 for the coefficient, the object will be 2 times longer on the axis selected, 0.5 will make the object 2 times shorter (half) on the axis selected.

Once your choice ends, the program automatically returns to the TRANSFORM menu. As usual you can select another transformation, or return to the main menu by pressing ESC.

4.5 DILATION

This option is an extension of the previous one, because it allows you to shrink or magnify an object. For this it is sufficient to give the coefficient of expansion. As before, 2 will give an object 2 times larger, 0.25 an object 4 times smaller (indeed 0.25 = 1/4).

4.6 HOMOTOPY

A homotopy is a progressive deformation of the exponential type. For example, a plane becomes a hump when it undergoes homotopy. This deformation can be looped along one of the 3 axes: OX, OY and OZ. Then we must also define the maximum value that the deformation will take at the level of the axis, and the radius of the circle on which the deformation will have. Once these three elements are defined. the program deforms and returns to the TRANSFORM menu.

5 MERGE

By using TRIDIM, one quickly realizes that creating a complex object is not always an easy thing. So the CONCORDE example was not created in a single stream. The fuselage was first drawn then the wings, and finally the rudder These objects were backed up separately as files, then merged into a single object, called

CONCORDE. It is therefore advisable for a complex object, to create it piece by piece and then to group them into a single object. This is the purpose of the MERGE option.

The program first asks you if the first object is in memory, if it is not, it asks you its name (eg flp1_GLASS), then asks you for the name of the second object and the third... etc. The program stops when you answer NO. It merges all these objects and asks you the name under which you want to save this set. This name as above must be preceded by the device name, for example: FLP1_GLASS or FLP1_CONCORDE. All backup devices are allowed. There is however a condition on the merged object: it must not exceed the 200 chains. Do not worry too much, the program will see that you have not made objects too long. After executing the merge, the program automatically returns to the main menu.

6 BLOCK

As you have seen, the MERGE function is very useful, but it has the disadvantage of being limited by the barrier of the 200 chains. There is a way to circumvent this disadvantage, this is to create a BLOCK. A block is a set of predefined object names of the name of the device on which they are stored (for example, flp1_name). One can thus create a block containing as many objects as one wants. The only disadvantage is that one can not transform a block as a whole, or transform objects one by one. When using a BLOCK (for example to draw it), of course, all the objects in the BLOCK must be in the device with which they are associated. But reassure you that a single cartridge can already save many objects.

When choosing BLOCK, a menu appears. Let's look at its 2 options.

OPTION FORM A BLOCK:

This option allows you to create a form and object names file. The first thing the program asks you is the number of objects that will be in your block. Then you only have to enter the sequence of names in the usual form: device_name. Once this list has been entered, the name of the block must be given, always in the device_name form. After that, the program returns to the BLOCK menu.

OPTION LIST A BLOCK:

This function allows you to see the names of the objects contained in a block, you just have to give the name of a block in the usual form: device_name. the return is then automatic to the BLOCK menu.

7 SAVE

When you have finished creating an object, or when you have just finished a modification of this object, you may need to save it to a file. This is what the backup option is used for. The program then asks you the name you want to give to your object and also the name of the device. You enter this in the form dev1_name or flp1_name or even ram1_name for those who have a virtual disk routine and also enough memory. After the backup is complete. the program returns to the main menu.

8 LOAD

This function, unlike the previous one, makes it possible to recall an object into memory. The syntax is the same, i.e. for example flp1_name.. etc. But beware, when you load an object, the object that was in memory is lost because the program resets the string counter to zero before loading the new object. When the program has finished loading, it automatically returns to the main menu.

9 REPRESENT

Using this function, you will be able to draw on the screen the objects you have created. The TRIDIM representation system is based on human vision. It also takes into account the deformations that our eye records with respect to reality.

The point towards which one looks is always the origin, the coordinates of the eye are given by angle of azimuth, the angle of site and the distance of the eye from the origin; a last element is necessary, it is the distance of the screen on which the image is projected. The change of the distance of the screen makes it possible to change the size of the image, for example the more the screen is away from the image the larger it makes it, and vice versa. On the other hand, if the eye moves closer to the object, the object grows, but the deformation effect of the perspective also increases.

The angle of vision of the eye is 60 degrees, which is 30 degrees on both sides. These 30 degrees form the angular aperture. But with 30 degrees, deformation begins at the edge of the image. A value that involves virtually no deformation is 15 degrees, but be careful you have to move your eye away to have the same field again. You can however have a "fish-eyes" type of vision, as in photography, giving 90 degrees of angular aperture.

The coordinates of the centre of the image will give the direction of sight (see FIG. 7).

The program, even if you have not changed the standard parameters, will then proposes 3 possibilities, which we will look at.

1 FULL SHEET OPTION:

When you choose this option, the program draws on a sheet that completely occupies the screen. When the program has finished drawing, you can go white on a black background and vice versa by pressing the N key. A screen dump may be made with the S key. You can exit this option and return to the menu giving the 3 representation systems by pressing ESC.

2 HALF-SHEET OPTION:

This option is the same as the previous one, except that it uses only the bottom window. You also have the opportunity to change background and do a screen dump. You return to the menu of 3 systems by pressing ESC.

3 SYSTEM 4 VIEWS OPTION:

This system of representation is the most complete. Indeed, it allows you to make a perspective view, plus 3 projections as in industrial design. For the perspective view, the program asks if you want to change the standard parameters for the 3 projections. The three views in projection have their axes arranged as shown in fig. 8. The required scales correspond to the scales on the axes as shown in fig. 9. The coordinates requested are those of the centre of the image. Indeed the scale on the axes is not enough, it is necessary to also give an origin for the 3 axes (see FIG. 10). After that the program draws the 4 views. You can then, as in the 2 other options of REPRESENT, exchange the ink and paper by pressing N. A screen dump may be made with the S key. To return to the menu of the 3 options, press ESC.

After selecting one of the above options, you are then given the following three options.

1 OBJECT IN MEMORY OPTION:

This option is chosen when you want to represent the object that is in memory. The program then moves to the menu giving the 3 screen modes that we will detail later.

2 DRAWING BY ELEMENT OPTION:

It is possible to represent several objects. For this they must all be recorded on one of the peripherals. the program asks you here how many objects you want to represent. Then you must give it the list of objects in the usual form: device_name. Finally, it must be ensured that all the objects cited are in their associated peripherals. Then the program gives you the choice between the 3 modes that we will see later.

3 DRAWING A BLOCK OPTION:

It is finally possible to draw all the objects included in a block. Simply choose this option and then give the name of the block you want to draw. The name of the block must be in the usual form: device_name. It is also essential that the objects making up the block are all in their associated device. The program then goes to the menu offering the 3 modes of representation that we will look at.

To exit the REPRESENT option, press ESC again.

10 DEVICE

This option gives access to a new menu to give the directory of a device (DIRECTORY), FORMAT, or DELETE a registered object on a device. Just press a key to return to the main menu.

11 ORIGIN

This function allows you to auto-centre an object with respect to the origin. It is for example very useful to use with the MANIPULATION program.

12 QUIT

You will be asked if you want to Quit entirely, or start the MANIPULATION program. If you select the MANIPULATION program, a SBASIC window will open and start the MANIPULATION program.

Tridim will still be exist and can be selected in the usual ways by using CTRL-C or picking the required job. You can return to the main menu by pressing ESC.

Example of creating an object

We will now create step-by-step a bottle. First select the INVENT option by pressing I. Then press 3 to enter the CONNECT CIRCLES option. The program then asks you the number of meridians, choose for example the maximum, by giving 14. Then give 0,0 for the coordinates of the trace of the axes of the bottle. Then press ESC. Indeed there is no need to shift the axis of the doubt with respect to the axis OX.

Now give the abscissa and the radius of the first circle. To do this, type 0 and 0: indeed, the first circle must have a zero radius for the bottom of the bottle to be closed. Then press ESC. Then, when you want to continue, type Y to the question "another?". On the other hand the axis has not to change. You answer N to the question "do you want to change the trace?". This series of answers is repeated until the last circle. Here is a list of the abscissa and radius of the following circles:

Abscissa	Radius
0	100
500	100
700	30
800	30

After entering this data, type N at the question "another?". You can count the number of chains used. Indeed we have 5 circles and 14 meridians: we used 5 + 14 = 19 chains.

Then press ESC to go to the main menu. Our bottle is now created but it is lying on the OX axis. To raise it, it is necessary to make it undergo a rotation of axis OY and angle -90. To do this, type T for TRANSFORM, then R for ROTATION. Then select the OY axis by typing Y, then give zero coordinates for the trace of the axis of 0,0 rotation. Finally, give -90 degrees for the value of the rotation. Then press ESC

It would be interesting to draw the bottle together with the glass. For this you have to shift the bottle, otherwise they will be drawn on top of each other. Then type T to perform a translation, Press Y for the object in memory, then give 0,500,0 for the coordinates of the translation. Then press ESC twice to return to the main menu. It is now time to save your object, so type S, and give it for example the name: flp1_bottle.

We will now draw the glass and the bottle. To do this, select REPRESENT by typing R. We will change the standard parameters. To do this set the distance from eye to 2000, then press ESC. Select 2 for Half-sheet, and 1 for object in memory.

Press ESC twice, Select REPRESENT again, press ESC again to accept the values, then select 1 for Full-sheet. Select DRAWING BY ELEMENTS by typing 2. Give the number of objects that is 2. Then enclose the names of the objects that are: flp1_glass and flp1_bottle. The drawing is then realized.

MANIPULATION

The MANIPULATION program is started from TRIDIM, by pressing Q to EXIT then M For MANIPULATION. Or it may be started from SBASIC by typing LRUN device_MANIP3_BAS.

MANIP3_BAS is a program that allows you to quickly manipulate an object. The first thing to do is to change an object drawn with TRIDIM. Then you can manipulate it by pressing a few keys. You need to know that the OX axis is perpendicular to the screen and directed towards you, the axis OY is horizontal and directed from left to right, the axis OZ is vertical and directed from bottom to top.

When asked for the Object name, Enter the device and filename for example flp1_bottle. Enter ‘quit’ to stop the program running.

MANIP3_BAS is capable of drawing to a screen larger than 512x256 pixels. You can change the variables x, and y near the start of the program to your required screen size.

After loading the object, you can then use the following keys
X then right cursor, for a negative rotation on the OX axis
X then left cursor, for a positive rotation on the OX axis
Y then right cursor, for a negative rotation on the OY axis
Y then left cursor, for positive rotation on the OY axis
Z then right cursor, for a negative rotation on the OZ axis
Z then left cursor, for a positive rotation on the OZ axis
cursor keys to move the object left/right, up/down
N to zoom out
P to zoom in
ESC to select a new object

For rotations about the axis, see fig. 6, where the X axis is coming out of the screen at you.

If nothing initially appears on the screen, you may need to use the cursor keys to move the object into view.

Fig 1

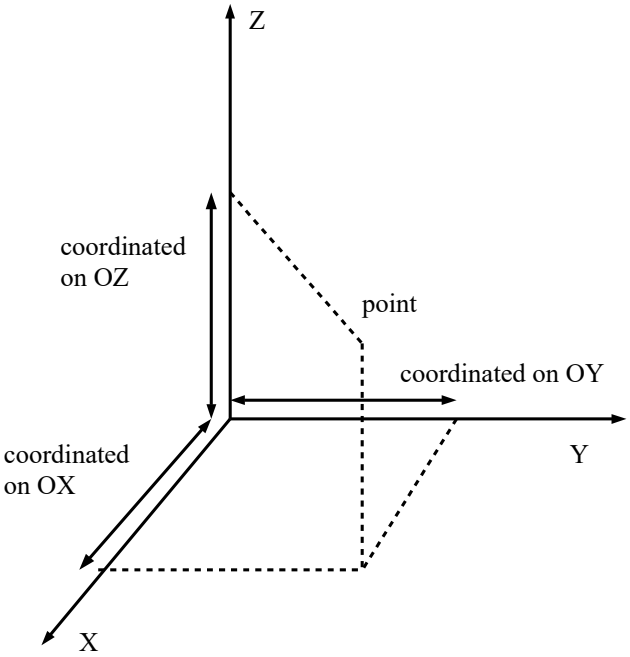

Z
coordinated
on OZ
point
coordinated on OY
coordinated
on OX
Y
X

Fig 2

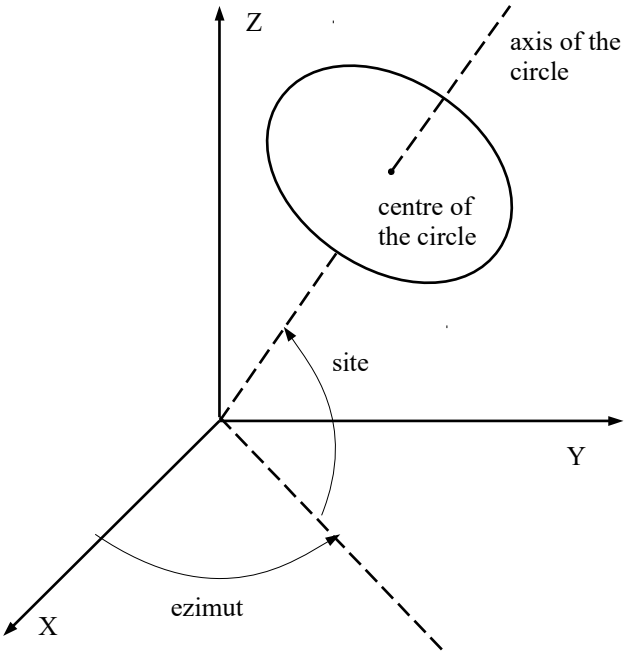

Z
axis of the
circle
centre of
the circle
site
Y
X
ezimut

Fig 3

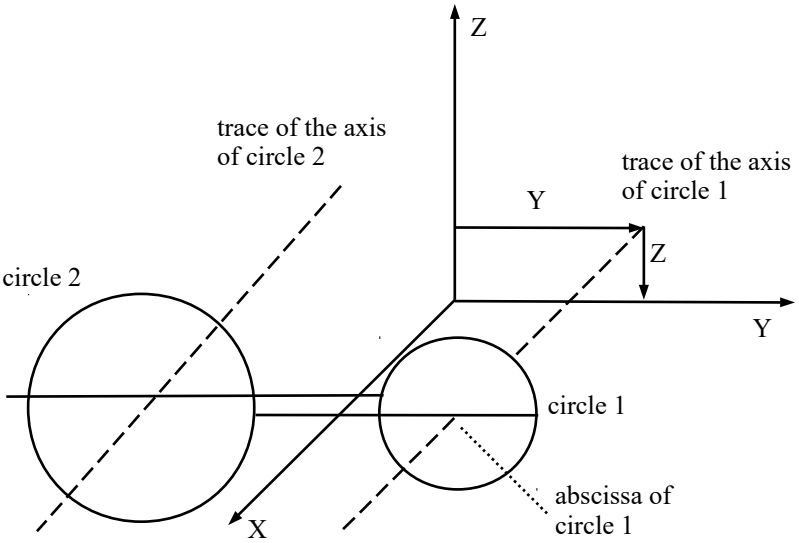

Z
trace of the axis
of circle 2
trace of the axis
of circle 1
Y
Z
circle 2
Y
circle 1
abscissa of
circle 1
X

Fig 4

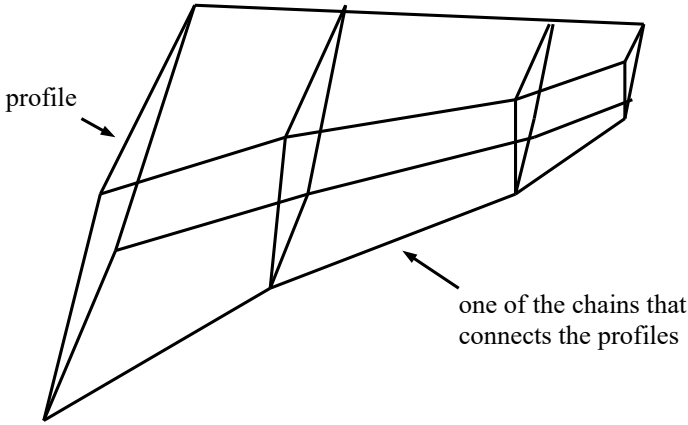

profile
one of the chains that
connects the profiles

Fig 5

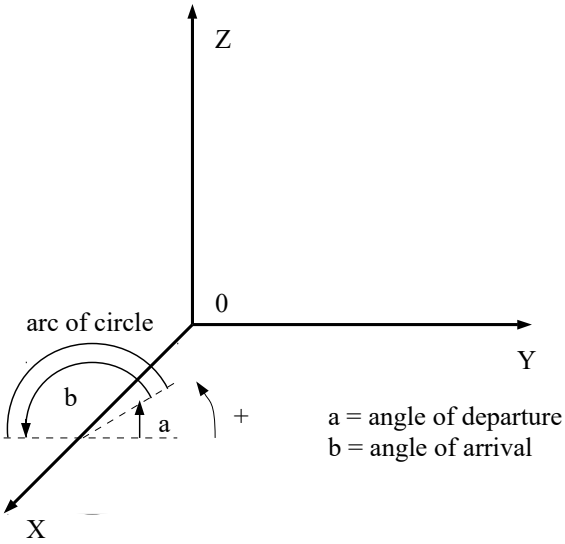

Z
0
Y
X
arc of circle
b
a
+
a = angle of departure
b = angle of arrival

Fig 6a

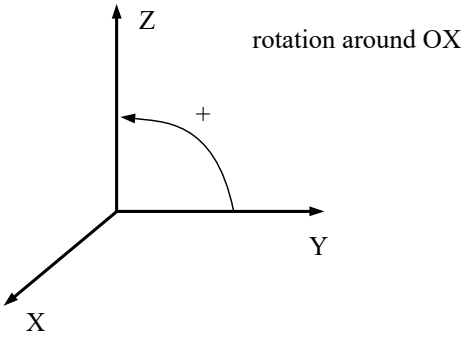


Fig 6b

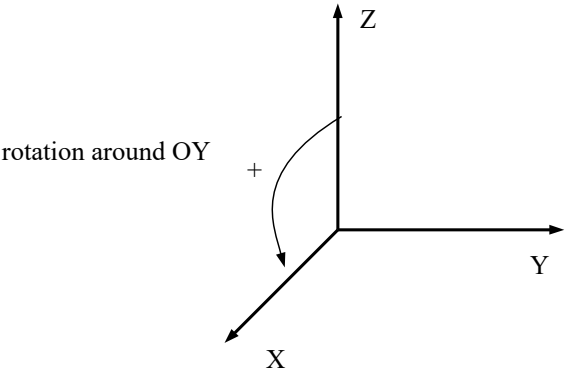


Fig 6c

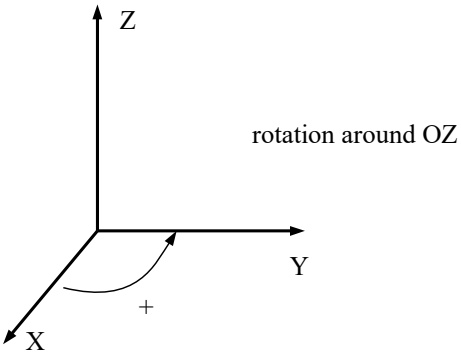


Fig 7

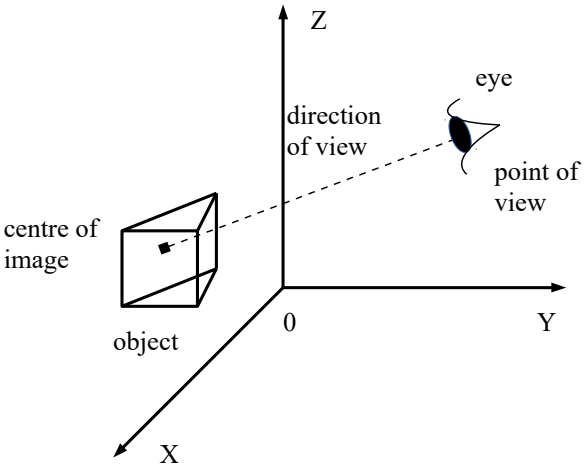

Z
eye
direction
of view
point of
view
centre of
image
object
0
Y
X

Fig 8

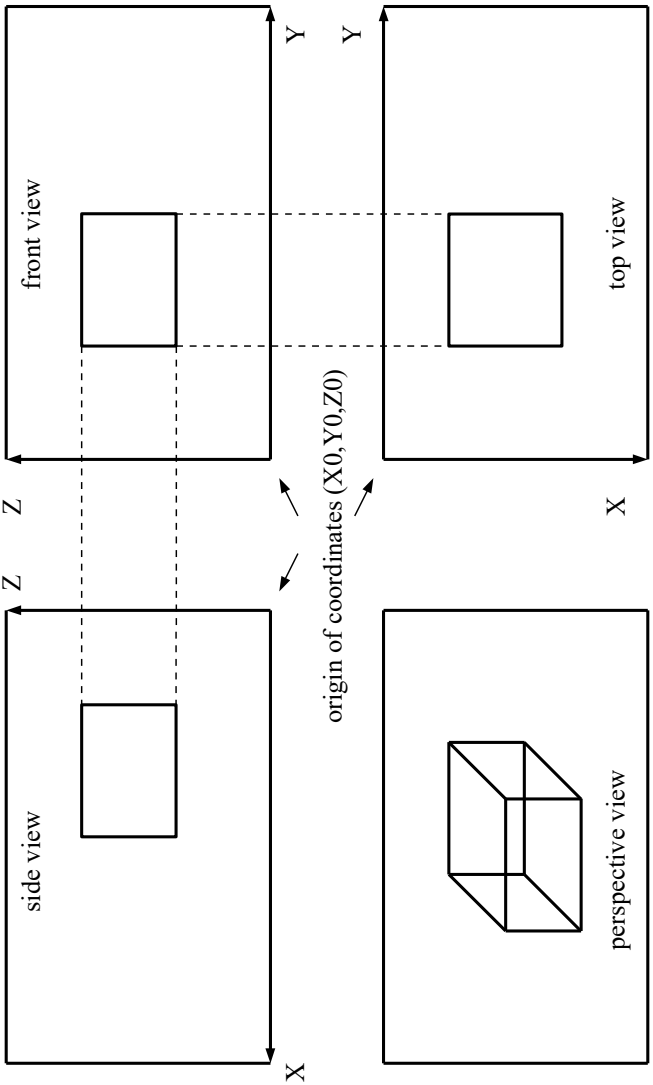

front view
Y
Z
top view
Y
X
origin of coordinates (X0,Y0,Z0)
Z
side view
X
perspective view

Fig 9

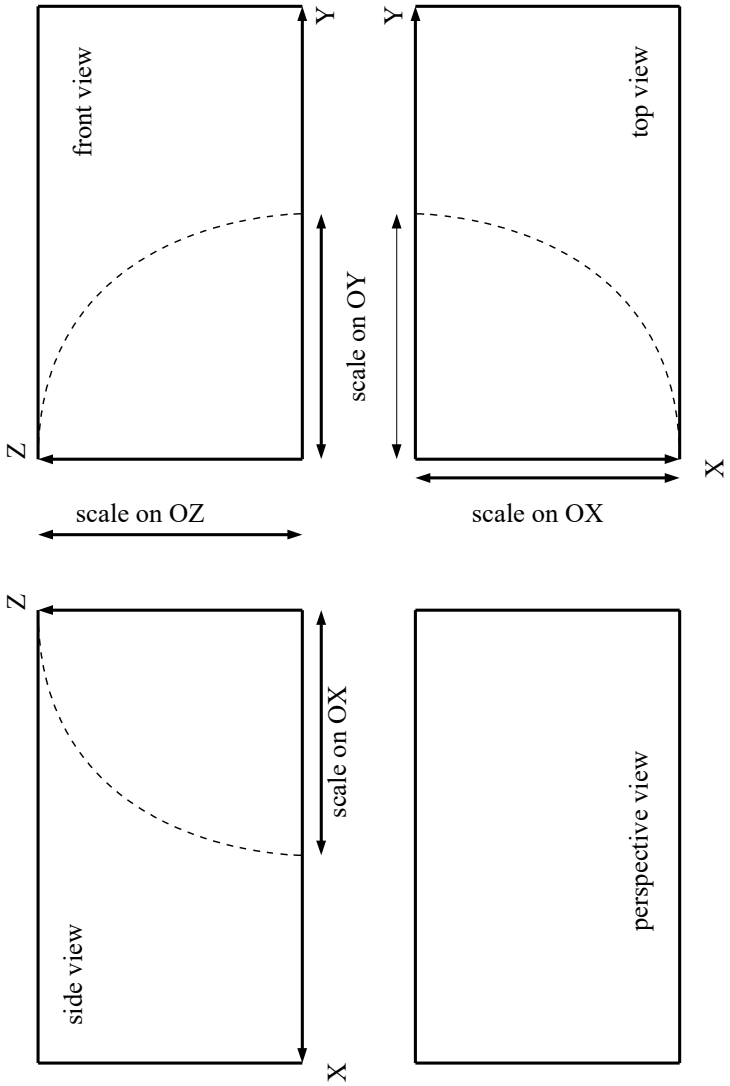
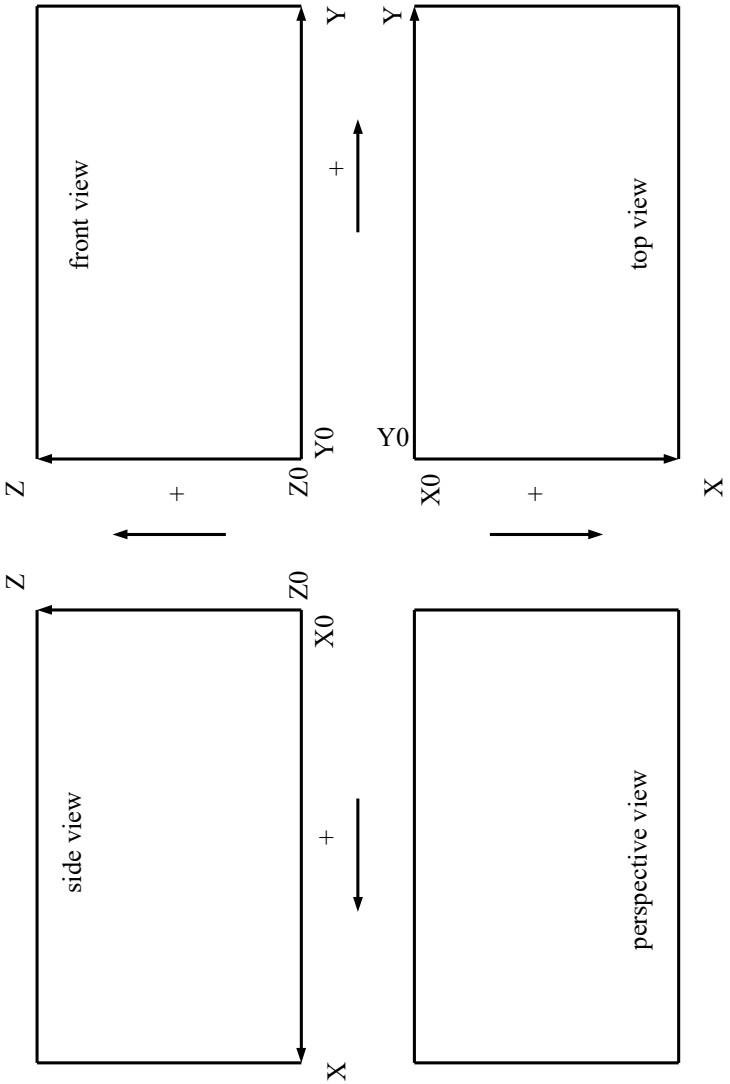

front view
Y
Z
scale on OY
scale on OZ
top view
Y
X
scale on OX
side view
Z
scale on OX
X
perspective view

Fig 10



X0, Y0 and Z0 are the coordinates of the centre of the system 4 view

PYRAMIDE SOFT

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