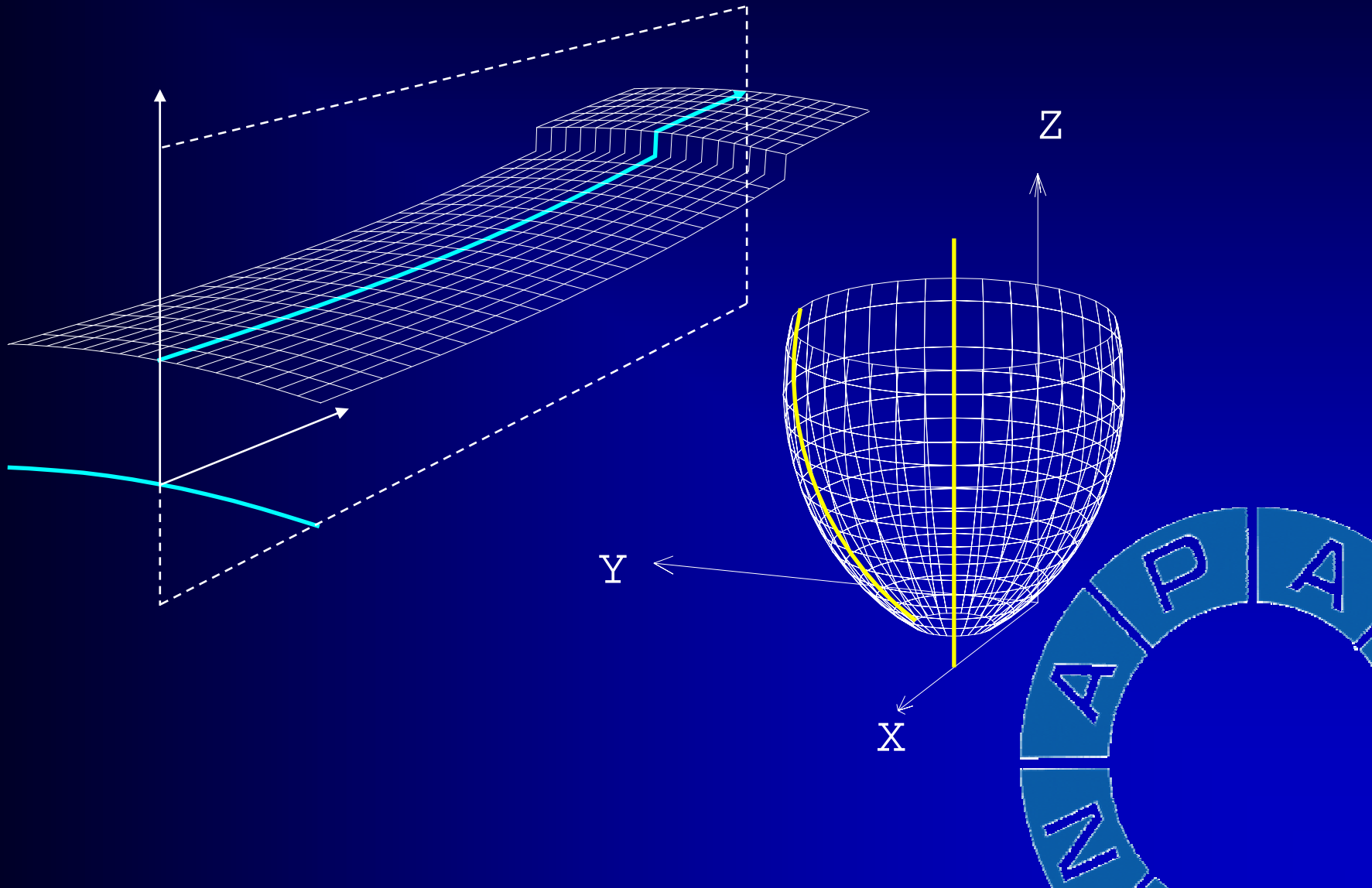


# Special Surfaces

Napa Ltd

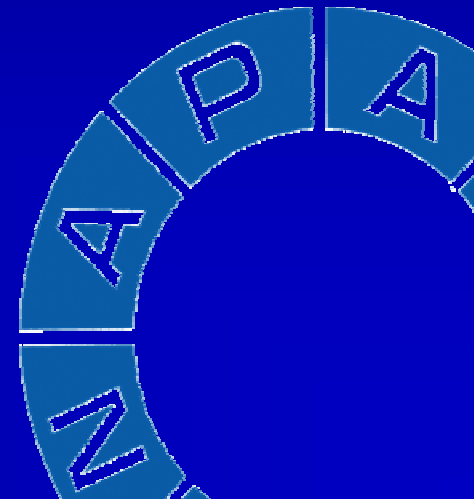


# Special Surfaces



# Contents

- ❖ Plane
- ❖ Cylinder and double cylinder
- ❖ Connection surface
- ❖ Facet surface
- ❖ Special surface examples and definition exercises



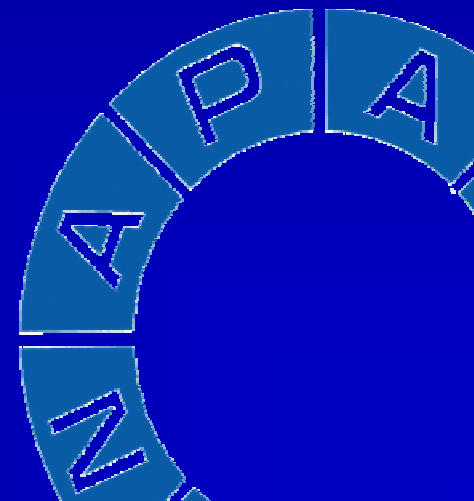
# Special Surfaces

- ❖ A special surface can be a plane, a cylinder, a sphere, etc.
- ❖ Special surfaces are needed for room & structure definition
- ❖ Many times the special surfaces are facet surfaces i.e. made out of straight plane parts

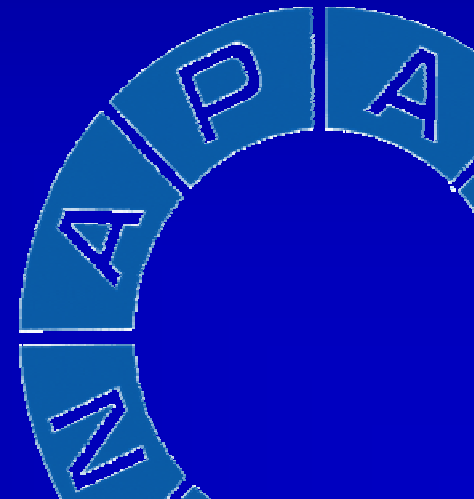
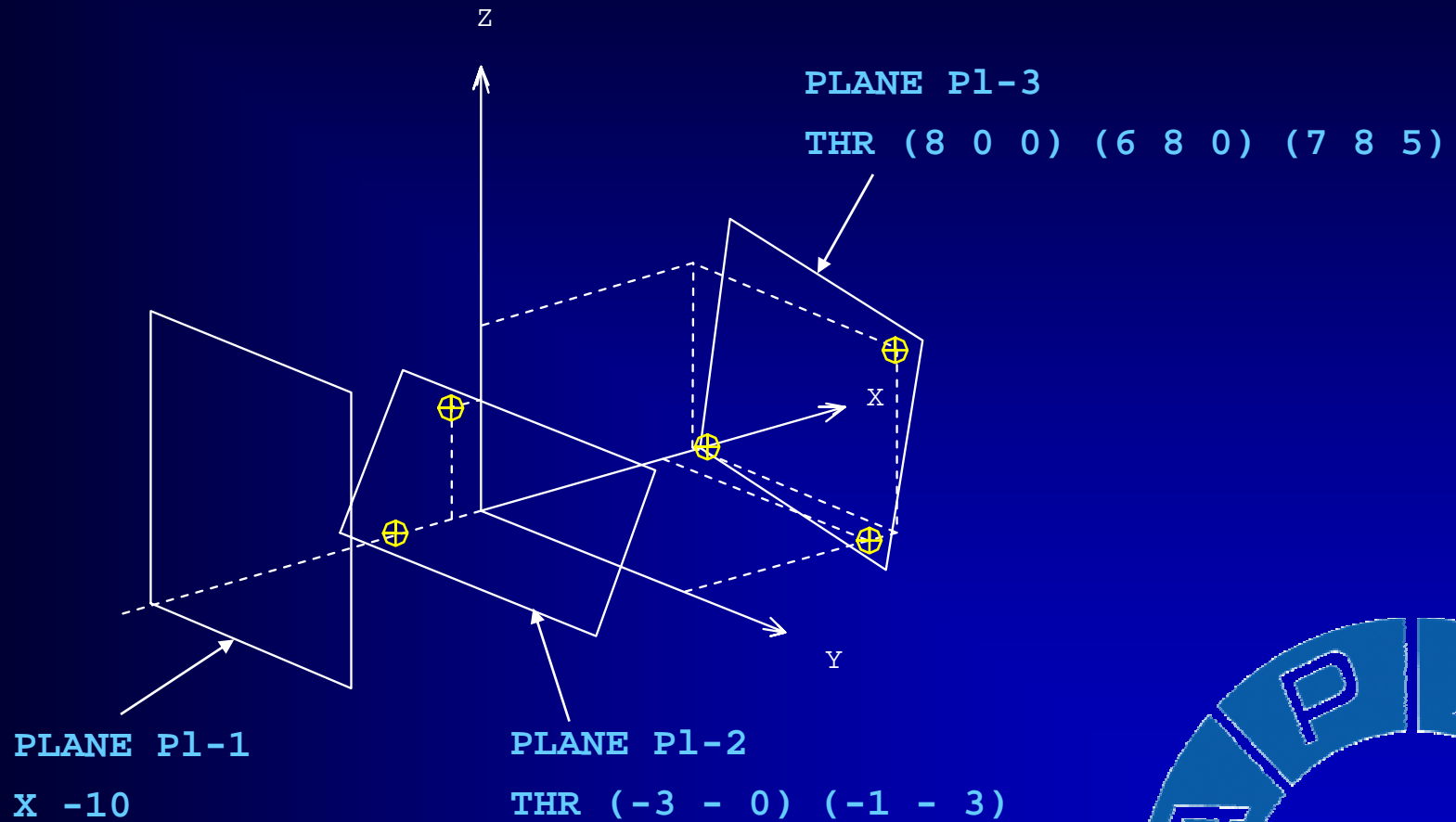


# Plane

- ❖ Definition of a plane includes:
  - ❖ Name of the plane
  - ❖ Descriptive text (option)
  - ❖ X,Y,Z coordinate or
  - ❖ 2 - 3 coordinates given after 'THROUGH'



# Plane: Example



# Cylinder

- ❖ A **cylinder** is formed when a curve, the **base**, is moved a specified distance in space along a straight line (or vice versa). The straight line is called the **generator**. The base can be either a pre-defined curve or defined as part of the cylinder definition
- ❖ If the cylinder ends are closed, the optional **CLOSE** command adds the ends, making a closed surface



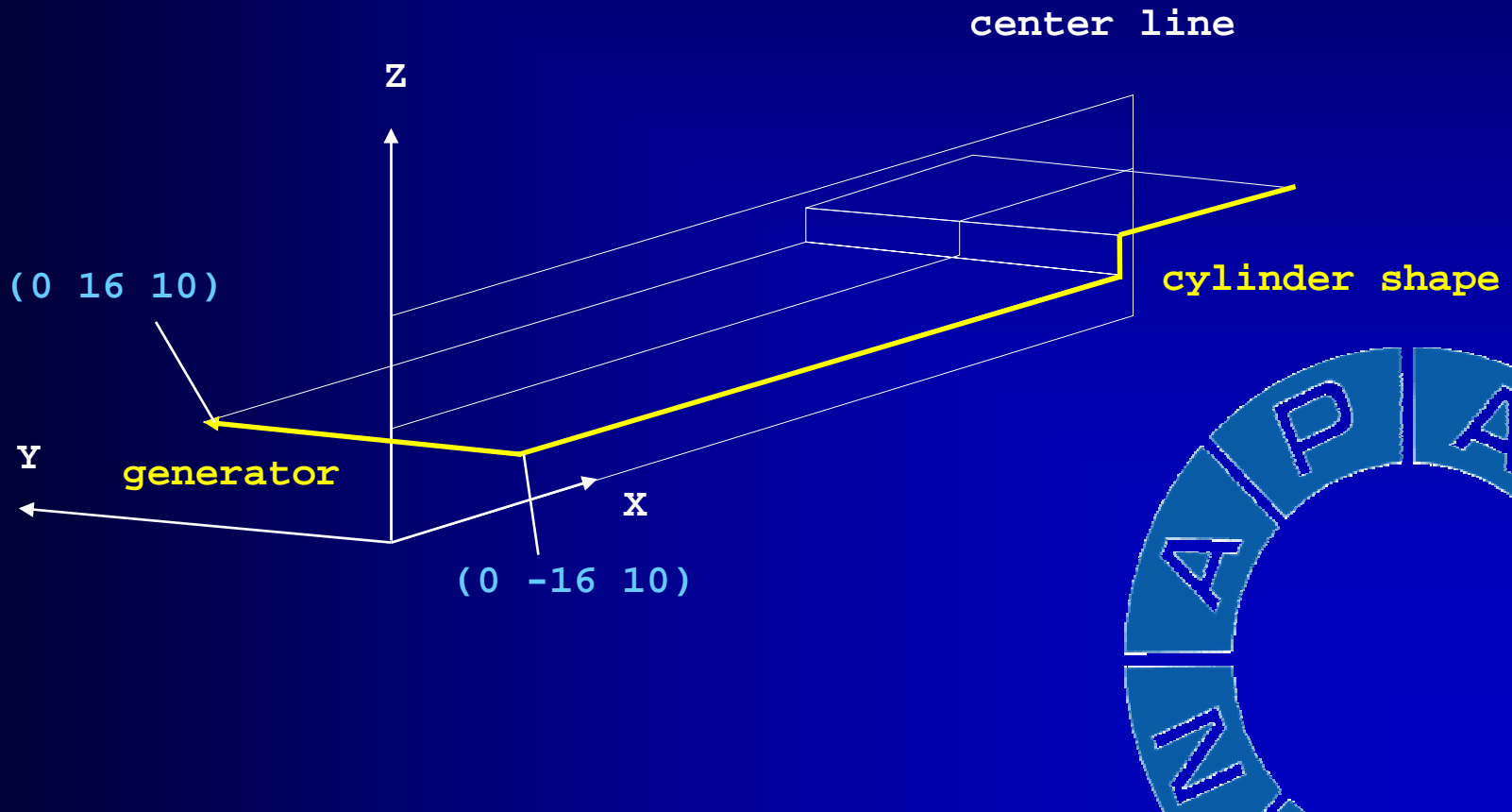
# Cylinder: Example 1

```
CYL DECK-exam
```

```
Y -16
```

```
XZ <> (0 10) (100 10) (100 13) (130 13)
```

```
GEN Y 32
```

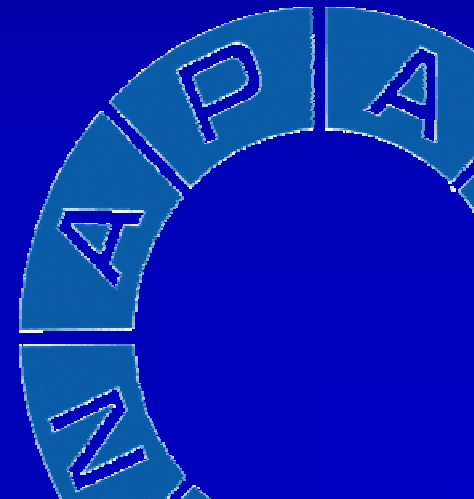
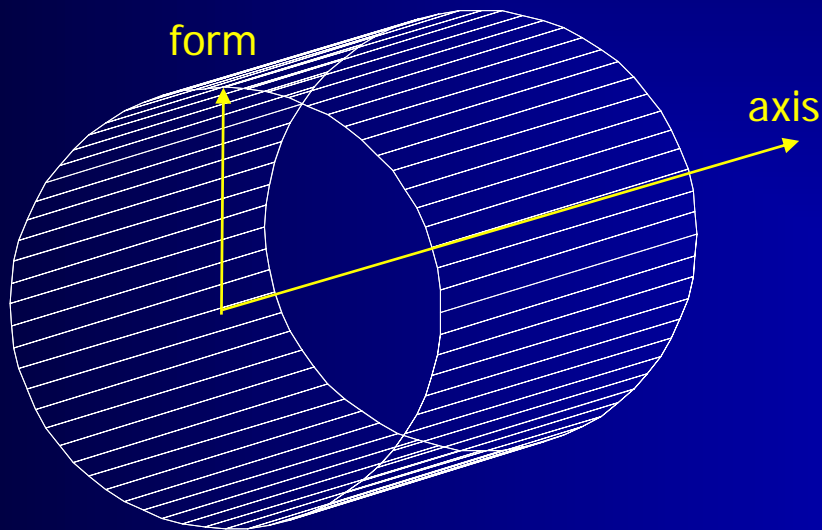




# Cylinder: Example 2

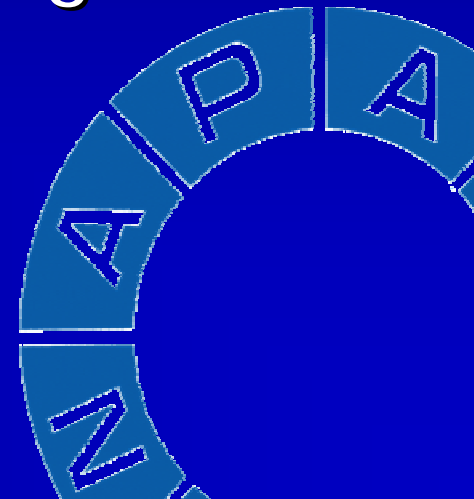
```
CYL TUNNEL  
AXI (74.2 -5 1.4) (74.2 5 1.4)  
FOR R=0.6  
CLOSE
```

An alternative method  
to define a cylinder is  
with the commands  
**AXIS** and **FORM**



# Double Cylinder

- ❖ A double cylinder differs from a regular one in that the surface has a curved form also in the direction of the generator
- ❖ **NOTE:** The generator must be defined so that it passes through the origin of the coordinate system

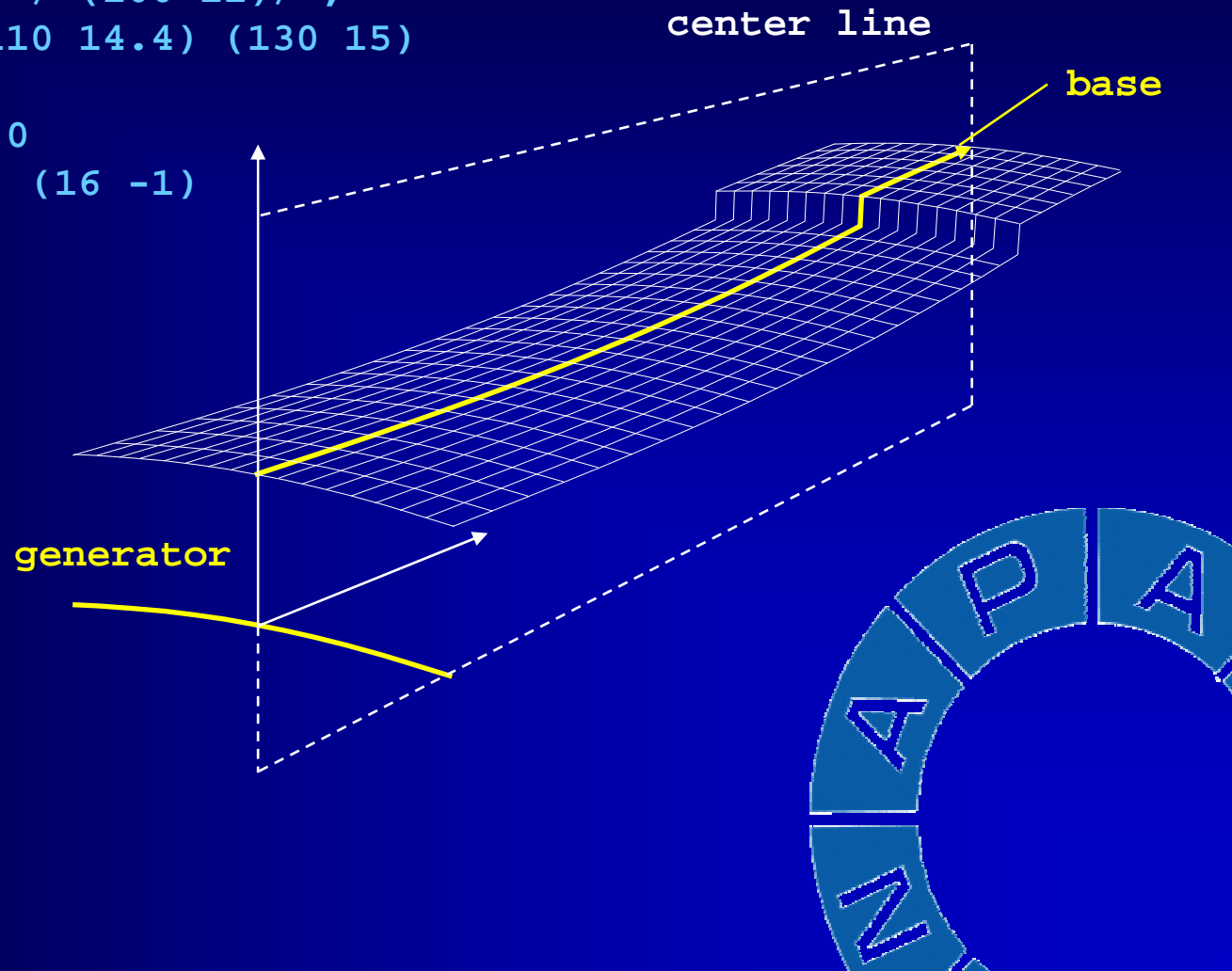


# Double Cylinder: Example

```
CUR BASE; Y 0  
XZ (0 10) (50 9) -/ (100 11)/- ,  
-/ (100 14) /- (110 14.4) (130 15)
```

```
CUR GENERATOR; X 0  
YZ (-16 -1) (0 0) (16 -1)
```

```
DCY DECK  
BASE BASE  
GEN GENERATOR
```



# Connection Surface

- ❖ A connection surface is formed when points on two curves are connected pair-wise. The curves can be defined separately. The curves are called base curves
- ❖ For the connection surface definition to succeed, base curves must be sufficiently similar (analogous starting points, same rotation direction)

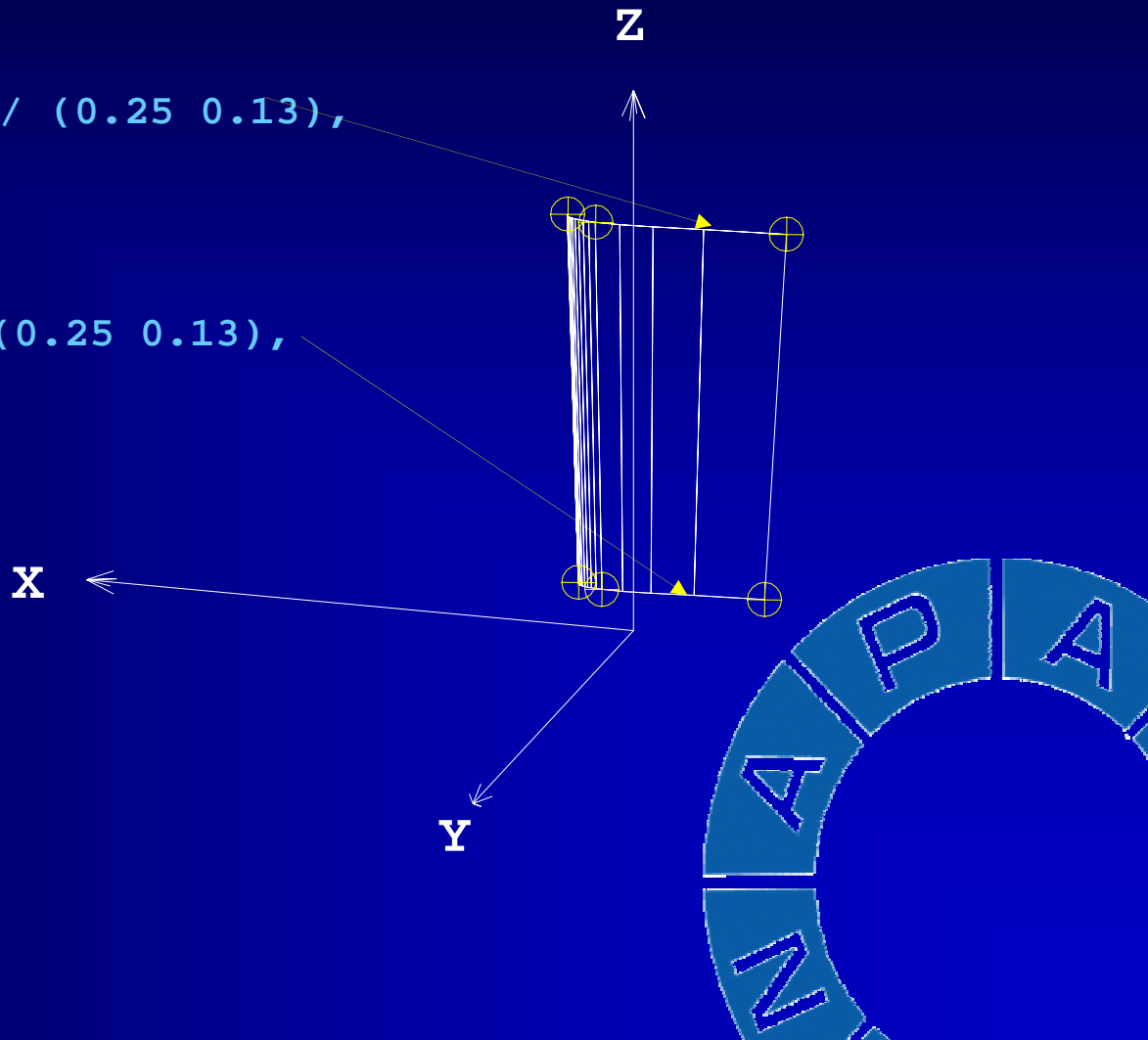


# Connection Surface: Example

```
CUR BASE1; Z 3.8  
XZ (-1.4 0) /5 -5/ (0.25 0.13),  
-90/ (0.5 0)
```

```
CUR BASE2; Z 0.1  
XY (-1.2 0) /5 -5/ (0.25 0.13),  
-90/ (0.5 0)
```

```
CNS RUDDER  
BASE BASE1  
BASE BASE2
```



# Facet Surface

- ❖ A facet surface can be defined through a set of  $n \times m$  points. Four neighboring points are connected to form a plane.
- ❖ If the points forming a facet do not lie on the same plane a warning is given, but the result is accepted



# Facet Surface: Example

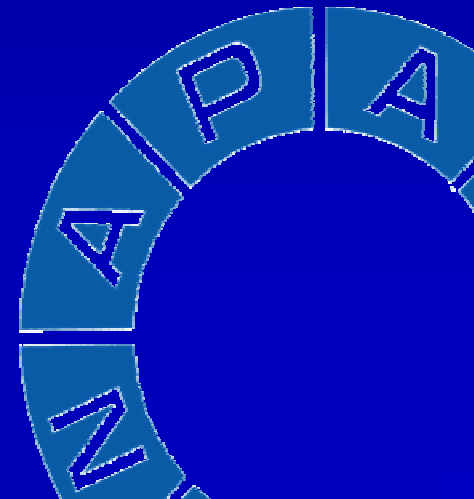
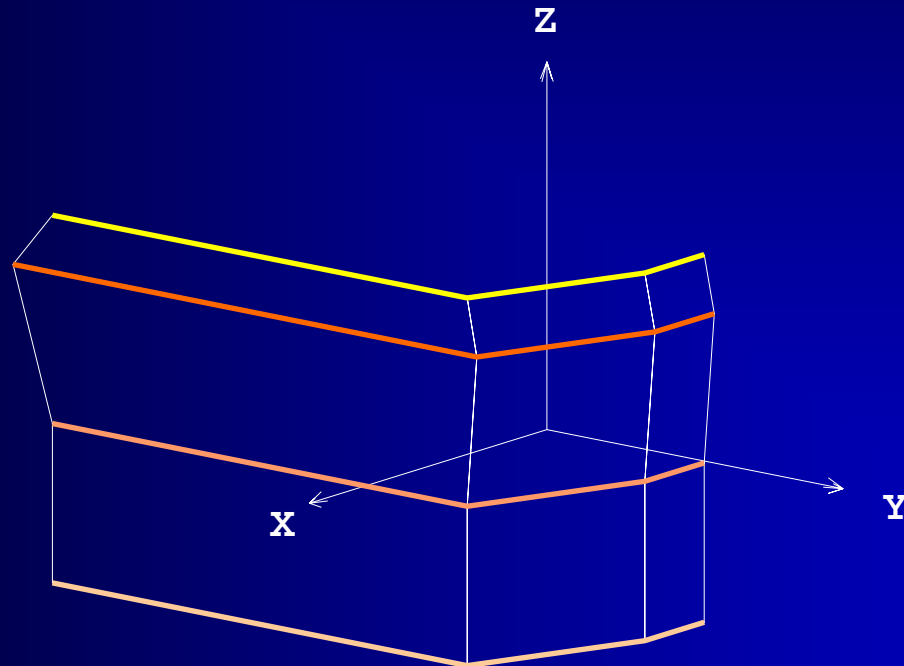
FCS BRIDGE

**FAC** (4 4.8 3) (4.75 4.8 3) (6.25 4.2 3) (6.25 0 3)

**FAC** (4.5 5.3 2.7) (5.25 5.3 2.7) (6.75 4.7 2.7) (6.75 0 2.7)

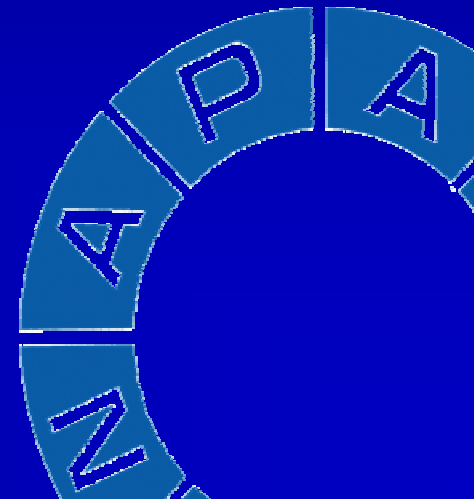
**FAC** (4 4.8 1.3) (4.75 4.8 1.3) (6.25 4.2 1.3) (6.25 0 1.3)

**FAC** (4 4.8 0) (4.75 4.8 0) (6.25 4.2 0) (6.25 0 0)



# Surface Definition Exercises

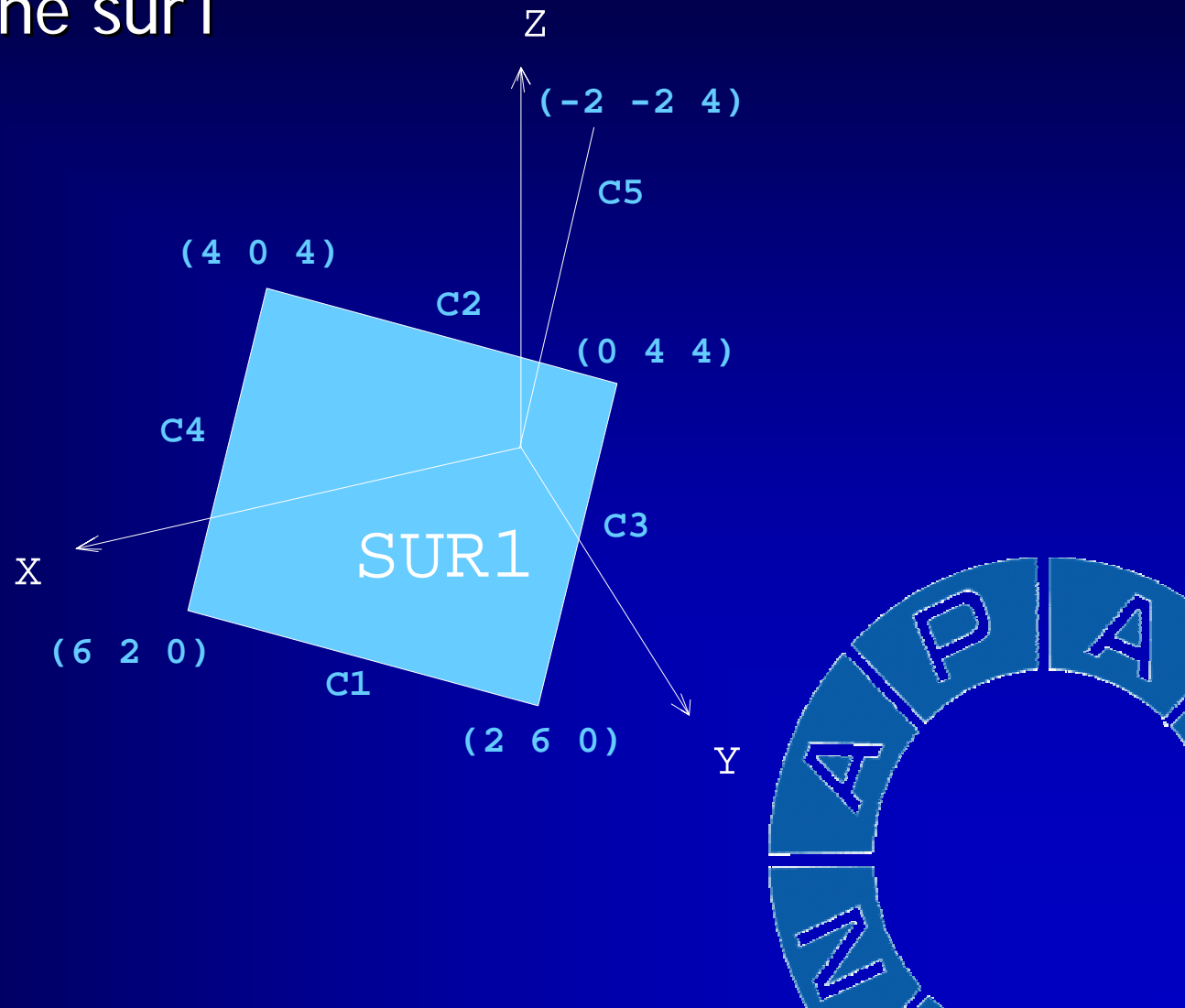
- ❖ Two exercises of special surface definition





# Surface Definition: Exercise 1

Exercise: define sur1



# Surface Definition: Exercise 1 Solution

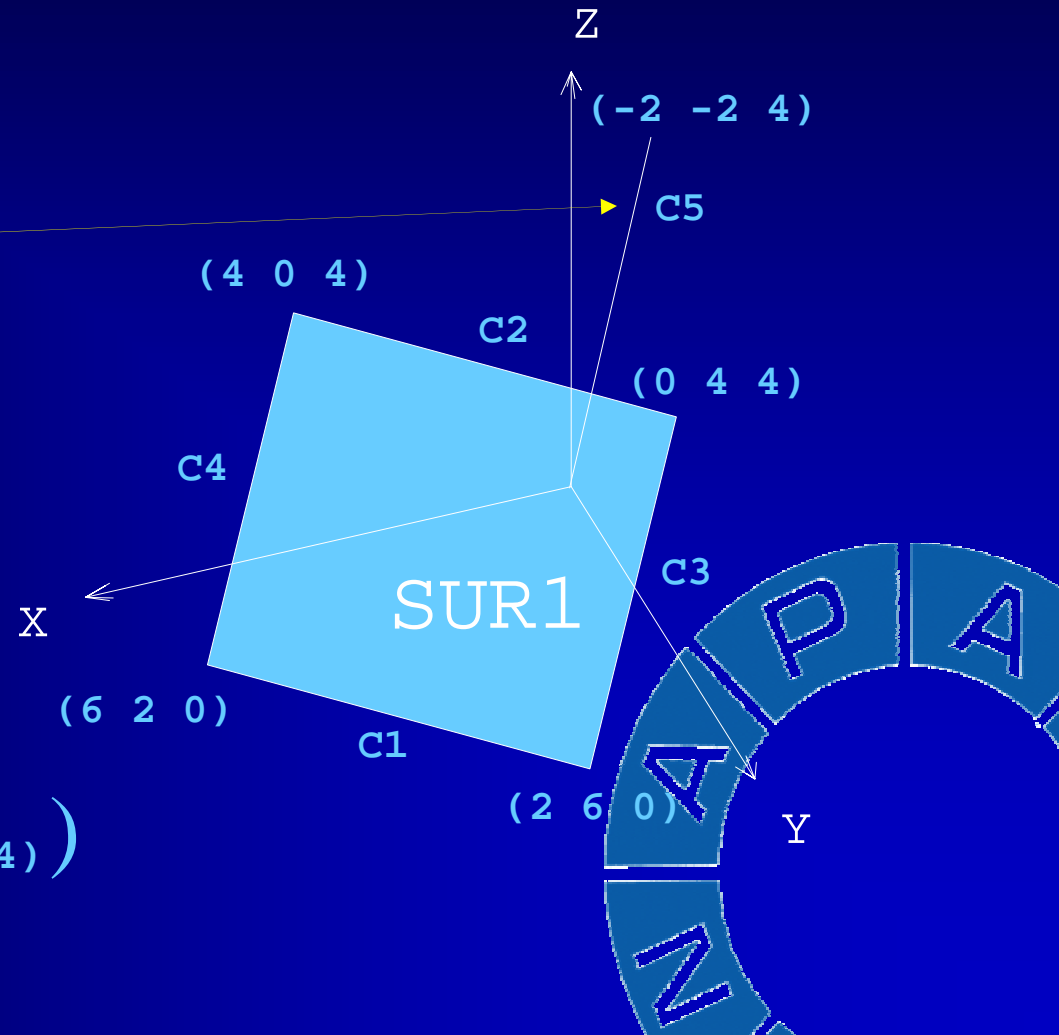
```
SUR SUR1
THR C1 C2 C3 C4
```

```
DCY SUR1
BASE C1
GEN C5
```

```
CNS SUR1
BASE C1
BASE C2
```

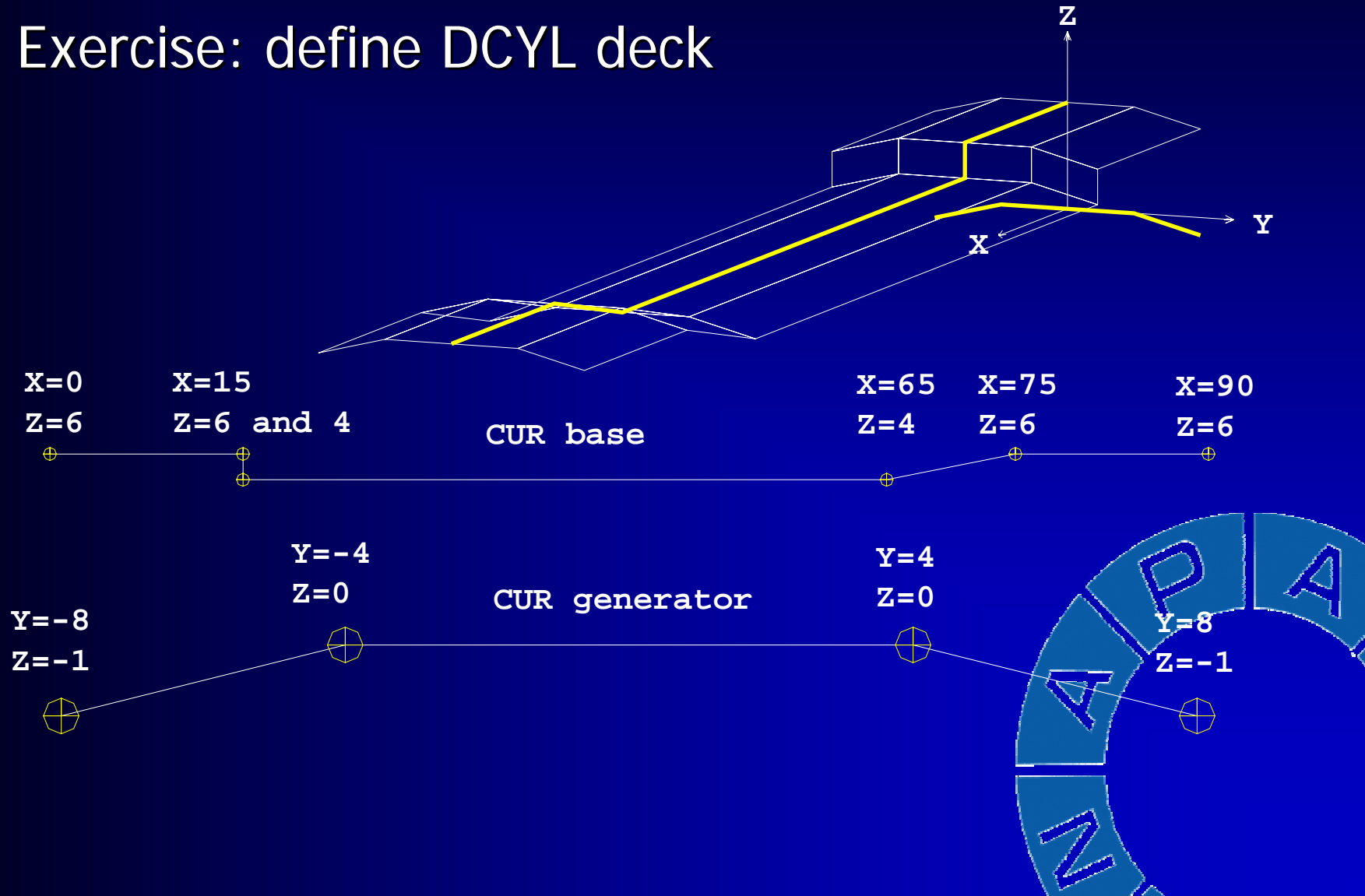
```
FCS SUR1
FAC (6 2 0) (2 6 0)
FAC (4 0 4) (0 4 4)
```

```
( PLA SUR1
  THR (6 2 0) (2 6 0) (4 0 4) )
```



# Surface Definition: Exercise 2

Exercise: define DCYL deck



# Surface Definition: Exercise 2

## Solution

CUR GENERATOR

X 0

YZ <> (-8 -1) (-4 0) (4 0),  
(8 -1)

CUR BASE

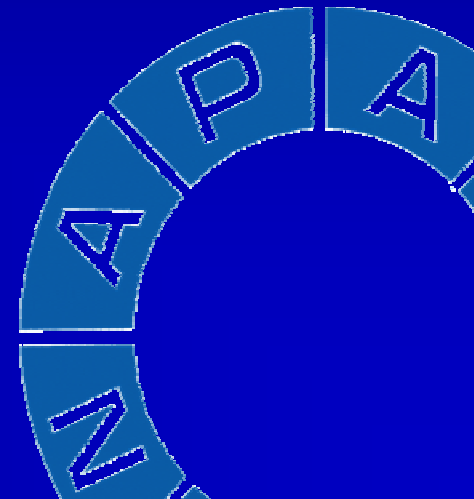
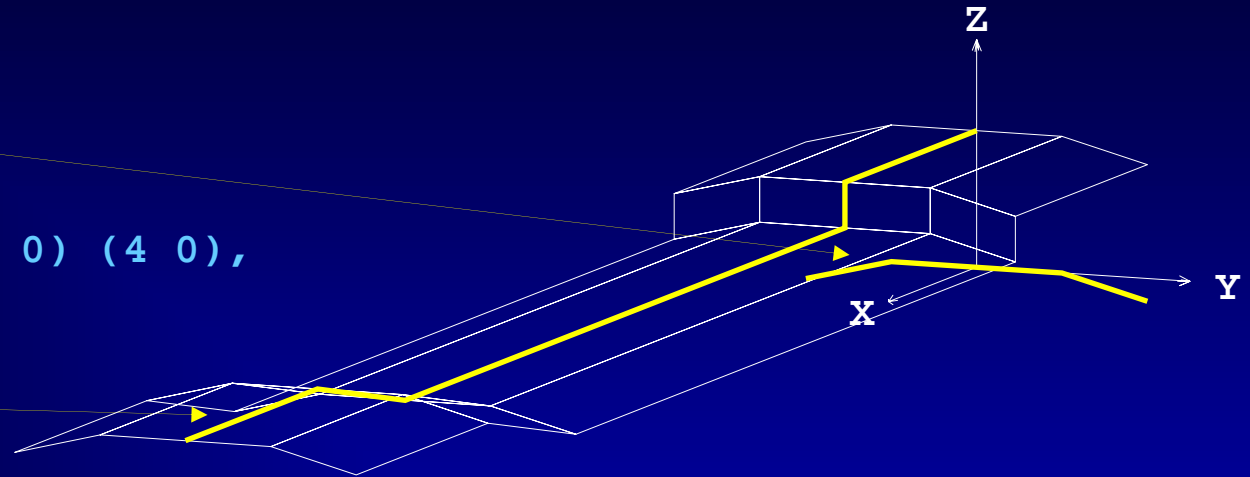
Y 0

XZ <> (0 6) (15 6) (15 4),  
(65 4) (75 6) (90 6)

DCYL DECK

BASE BASE

GEN GENERATOR



# Summary

- ❖ Plane  $\Rightarrow$  THR
- ❖ Cylinder and double cylinder  
 $\Rightarrow$  BASE + GEN
- ❖ Connection surface  $\Rightarrow$  BASE1 + BASE2
- ❖ Facet surface  $\Rightarrow$

FAC point1 point2 point3

FAC point4 point5 point6

