

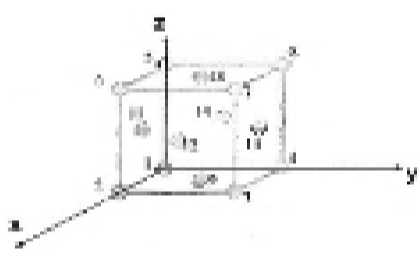
Point coordinates for unit cell center are
 $a/2, b/2, c/2$ $\frac{1}{2}\frac{1}{2}\frac{1}{2}$

Point coordinates for unit cell corner are 111

Chapter 3 - 4

In class problem (3.22)
 List point coordinates for all atoms associated with the FCC unit cell

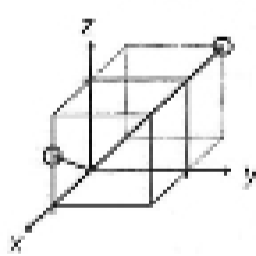
Atom	Point Coordinates
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	



Chapter 3 - 5

10/1

Crystallographic Directions



Algorithm

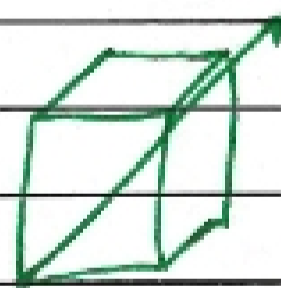
1. Vector repositioned (if necessary) to pass through origin.
2. Read off projections in terms of unit cell dimensions a, b, and c.
3. Adjust to smallest integer values.
4. Enclose in square brackets, no commas.

[uvw]

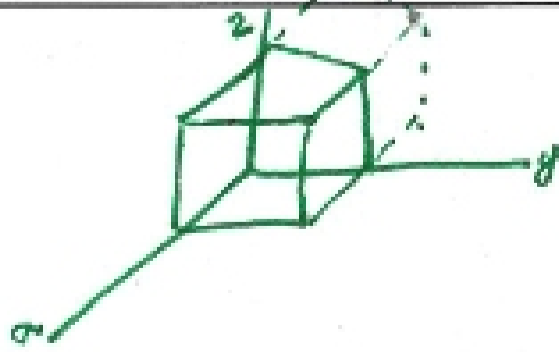
ex: 1, 0, $\frac{1}{2}$ \Rightarrow 2, 0, 1 \Rightarrow [201]
 -1, 1, 1 \Rightarrow $[\bar{1}11]$ where overbar represents a negative index

families of directions $\langle uvw \rangle$

Chapter 3 - 6




Final 111
 Initial 100
 [011]



$$\begin{array}{r} F \quad -1 \quad 1 \quad 1 \\ I \quad 0 \quad 0 \quad 0 \\ \hline -1 \quad 1 \quad 1 \end{array}$$

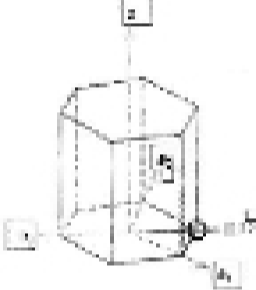
In class problem



For the hypothetical metal shown:
What are the indices for the directions indicated by the two vectors in the sketch

Chapter 3. 1

HCP Crystallographic Directions



Algorithm

1. Vector repositioned (if necessary) to pass through origin.
2. Read off projections in terms of unit cell dimensions a_1 , a_2 , a_3 or z .
3. Adjust to smallest integer values.
4. Enclose in square brackets, no commas.

$[uvw]$

ex: $\frac{1}{2}, \frac{1}{2}, -1, 0 \rightarrow [11\bar{2}0]$

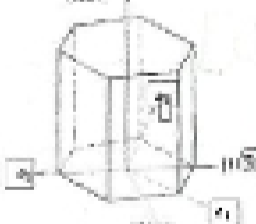
dashed red lines indicate projections onto a_1 and a_2 axes

Chapter 3. 2

Exam after Fall break

HCP Crystallographic Directions

- Hexagonal Crystals
 - 4 parameter Miller-Bravais lattice coordinates are related to the direction indices (i.e., $u'v'w'$) as follows



$$[u'v'w'] \rightarrow [uvw]$$

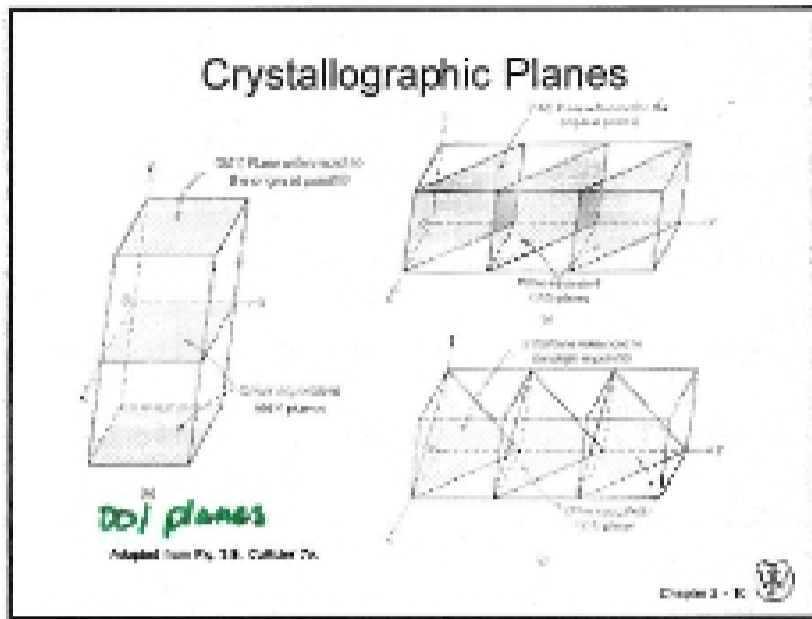
$$u = \frac{1}{3}(2u' - v')$$

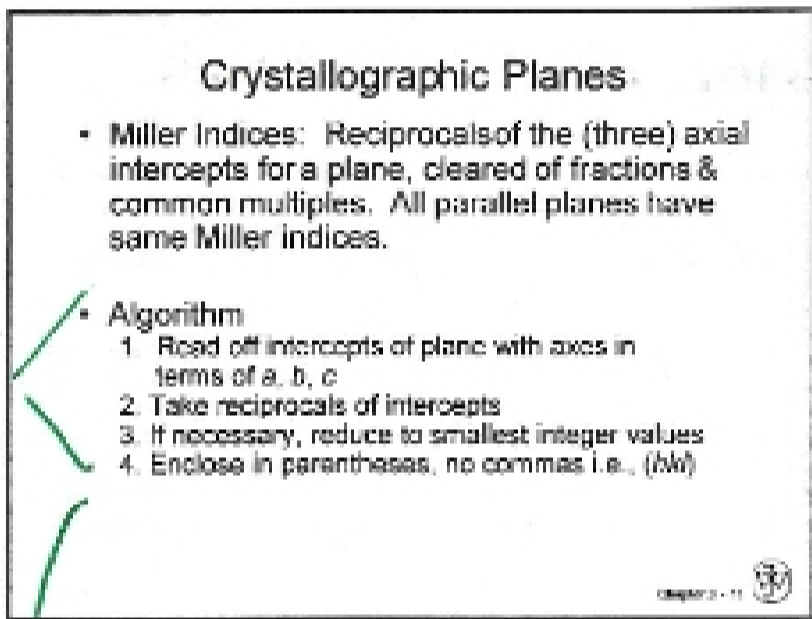
$$v = \frac{1}{3}(2v' - u')$$

$$t = -(u + v)$$

$$w = w'$$

Chapter 3. 3





Possible test problem

