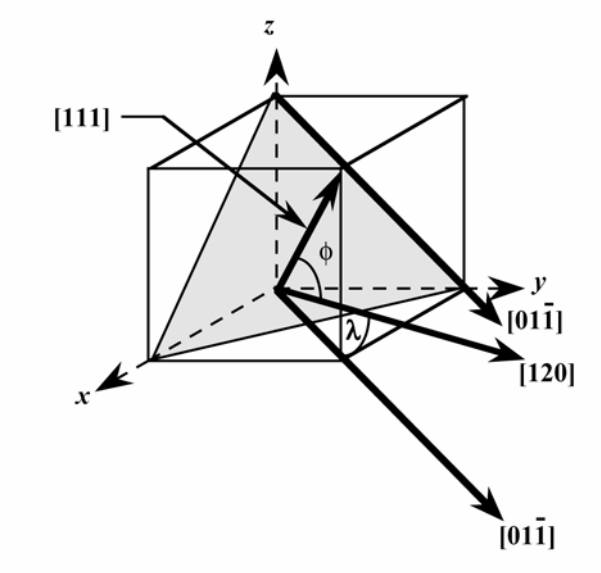
Slip in Single Crystals

7.11 We are asked to compute the *Schmid factor* for an FCC crystal oriented with its [120] direction parallel to the loading axis. With this scheme, slip may occur on the (111) plane and in the $[01\bar{1}]$ direction as noted in the figure below.



The angle between the [120] and $[01\bar{1}]$ directions, λ, may be determined using Equation 7.6

$$\lambda = \cos^{-1}\left[\frac{u_1u_2 + v_1v_2 + w_1w_2}{\sqrt{\left(u_1^2 + v_1^2 + w_1^2\right)\left(u_2^2 + v_2^2 + w_2^2\right)}}\right]$$

where (for [120]) $u_1 = 1$, $v_1 = 2$, $w_1 = 0$, and (for $[01\bar{1}]$) $u_2 = 0$, $v_2 = 1$, $w_2 = -1$. Therefore, λ is equal to

$$\lambda = \cos^{-1}\left[\frac{(1)(0) + (2)(1) + (0)(-1)}{\sqrt{\left[(1)^2 + (2)^2 + (0)^2\right]\left[(0)^2 + (1)^2 + (-1)^2\right]}}\right]$$

$$= \cos^{-1}\left(\frac{2}{\sqrt{10}}\right) = 50.8°$$