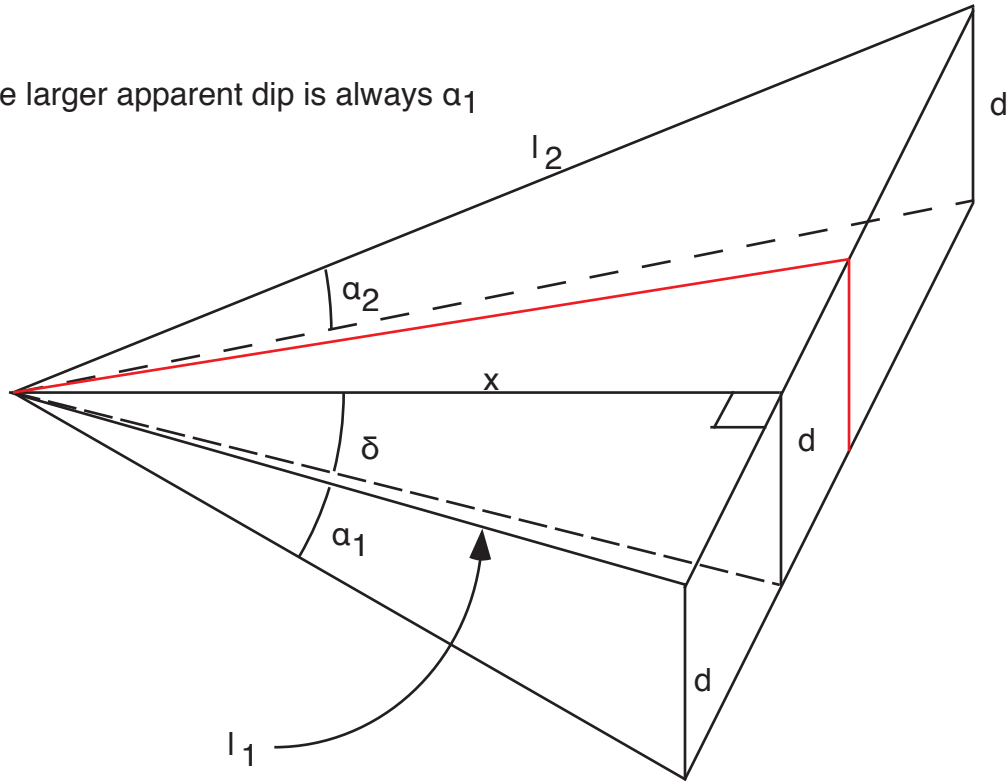


Two Apparent Dip Derivation

Note that the larger apparent dip is always α_1



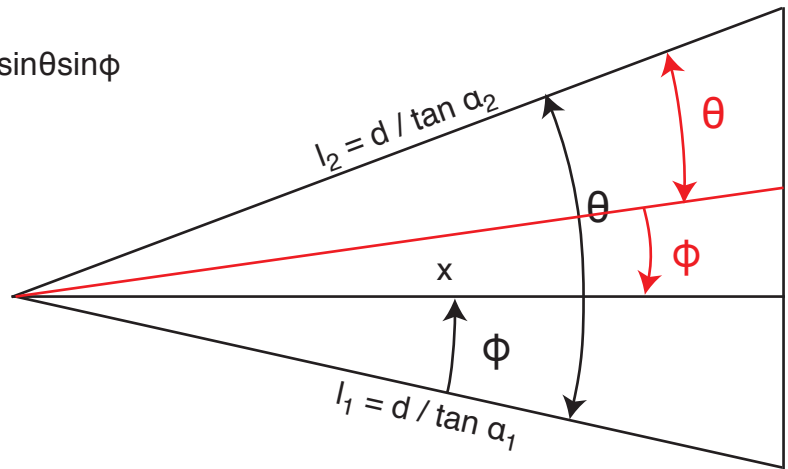
A: $x / l_2 = \cos(\theta - \phi) = \cos\theta\cos\phi + \sin\theta\sin\phi$

B: $x / l_1 = \cos\phi$

divide equation A by equation B to get:

$$l_1 / l_2 = \cos\theta + \sin\theta\tan\phi$$

$$\tan\phi = \frac{\frac{\tan\alpha_2}{\tan\alpha_1} - \cos\theta}{\sin\theta}$$



So, $\phi = \arctan \left[\frac{\frac{\tan\alpha_2}{\tan\alpha_1} - \cos\theta}{\sin\theta} \right]$

The sign issue is an important one. If ϕ is negative, it should be measured from l_1 in a direction which is away from, not towards, l_2 . This is shown with the red sketches above.

Once we have determined ϕ we see that $x = d \cos\phi / \tan\alpha_1$ and $\tan\delta = d / x = \tan\alpha_1 / \cos\phi$