

$$r = (Rs + W) \alpha$$
$$l = Rs \alpha$$
$$r - l = W \alpha$$

$$\alpha = \frac{r - l}{W}$$

$$Rs = \frac{l}{\alpha}$$

$$x_l = x + sd \cos(\theta)$$
$$y_l = y + sd \sin(\theta)$$

$$\cos(u \pm v) = \cos u \cos v \mp \sin u \sin v$$

$$\sin(u \pm v) = \sin u \cos v \pm \cos u \sin v$$

$$\cos(\theta + 90^{\circ}) = -\sin(\theta)$$
$$\sin(\theta + 90^{\circ}) = +\cos(\theta)$$

$$x_{obs} = x_l + x_{\$} + x_{\%}$$

$$= x + sd \cos(\theta) + x_{*} \cos(\theta) + y_{*} \cos(\theta + 90^{\circ})$$

$$= x + sd \cos(\theta) + D \cos(\phi) \cos(\theta) + D \sin(\phi) \cos(\theta + 90^{\circ})$$

$$= x + sd \cos(\theta) + D \cos(\phi) \cos(\theta) - D \sin(\phi) \sin(\theta)$$

$$= x + sd \cos(\theta) + D \cos(\theta + \phi)$$

$$y_{obs} = y_l + y_{\$} + y_{\%}$$

$$= y + sd \sin(\theta) + x_{*} \sin(\theta) + y_{*} \sin(\theta + 90^{\circ})$$

$$= y + sd \sin(\theta) + D \cos(\phi) \sin(\theta) + D \sin(\phi) \sin(\theta + 90^{\circ})$$

$$= y + sd \sin(\theta) + D \cos(\phi) \sin(\theta) + D \sin(\phi) \cos(\theta)$$

$$= y + sd \sin(\theta) + D \sin(\theta + \phi)$$