

FALSE Position

$$|M - \phi + E \sin(\phi)| < 0.01$$

$$M = 6.7$$

$$E = 0.23$$

$$X_a = 6 \quad X_b = 8$$

$$X_{int} = X_a - \frac{(X_b - X_a) f(X_a)}{f(X_b) - f(X_a)}$$

Solve: $M = \phi - E \sin(\phi)$

$$f(\phi) = M - \phi + E \sin(\phi)$$

$$f(\phi) = 0 \Rightarrow \phi = ?$$

X_a	X_b	$f(X_a)$	$f(X_b)$	X_{int}	$f(X_{int})$	$f(X_a) f(X_{int})$
6.000	8.000	0.636	-1.072	6.744	0.058	0.0369
6.579	8.000	0.188	-1.072	6.791	0.021	0.0039
6.791	8.000	0.021	-1.072	6.814	0.002	0.0000

Since $|f(X_{int})| = |f(6.814)| < 0.01$

$\Rightarrow X_{int} = 6.814 = \text{solution}$

$$\boxed{\phi = 6.814}$$

NEWTON - RAPHSON

$$|M - \phi + E \sin(\phi)| < 0.01$$

$$M = 7.8$$

$$E = 0.23$$

<u>X_0</u>	<u>$f(X_0)$</u>	<u>$f'(X_0)$</u>
10.000	-2.325	-1.193
8.050	-0.024	-1.045
8.020	0.007	-1.038

\Rightarrow $\phi = 8.027$

Solve $M = \phi - E \sin(\phi)$

$$f(\phi) = M - \phi + E \sin(\phi)$$

$$f(\phi) = 0 \Rightarrow \phi = ?$$

$$\underline{X_{imp} = X_0 - \frac{f(X_0)}{f'(X_0)}} \rightarrow -1 + E \cos(\phi)$$

8.051
8.027
8.027

SECANT METHOD

$$|M - \phi + E \sin(\phi)| < 0.01$$

$$M = 7.8$$

$$E = 0.34$$

Solve $M = \phi - E \sin(\phi)$

$$f(\phi) = M - \phi + E \sin(\phi)$$

$$f(\phi) = 0 \Rightarrow \phi = ?$$

<u>X_a</u>	<u>X_b</u>	<u>f(X_a)</u>	<u>f(X_b)</u>	<u>X_{int}</u>
6.000	8.000	1.705	0.16	8.174
8.000	8.174	0.136	0.0051	8.126
8.174	8.126	-0.051	0.001	<u>8.127</u>

$$X_{int} = X_b - \frac{(X_b - X_a) f(X_b)}{f(X_b) - f(X_a)}$$

Since $|f(X_b)| = |f(8.126)| < 0.01$

$$\Rightarrow \boxed{\phi = 8.126}$$