

太陽位置の基本式

$$\begin{aligned}\delta : \text{日赤緯} \quad \text{冬至} &= -23^{\circ}27' \\ &\text{夏至} = 23^{\circ}27' \\ &\text{春・秋分} = 0^{\circ}\end{aligned}$$

$$\begin{aligned}T : \text{時刻角} \quad &1 \text{時間あたり } 15^{\circ} (360^{\circ} / 24 \text{時間} = 15^{\circ} / \text{時間}) \\ \text{真太陽時} \quad &8 \text{時} = -60^{\circ} \quad 12 \text{時} = 0^{\circ} \quad 16 \text{時} = 60^{\circ}\end{aligned}$$

ψ : 緯度

h : 太陽高度

$$h = \text{ArcSin}(\text{Sin}(\psi) \times \text{Sin}(\delta) + \text{Cos}(\psi) \times \text{Cos}(\delta) \times \text{Cos}(T))$$

$$\text{影の倍率} = \text{Cot}(h) = 1/\text{tan}(h)$$

$$\text{太陽方位角} = \text{ArcSin}(\text{Cos}(\delta) \times \text{Sin}(T) / \text{Cos}(h))$$

$$\sin(\text{方位角}) = \cos(\text{赤緯}) \times \sin(\text{時刻}) \div \cos(\text{高度角})$$

$$\sin(\text{高度角}) = \sin(\text{緯度}) \times \sin(\text{赤緯}) + \cos(\text{緯度}) \times \cos(\text{赤緯}) \times \cos(\text{時刻})$$