構造力学	水理・土質	環境衛生	土木計画
[61] B	[66] C	[71] B	[121] A
[62] C	[67] C⁻	[72] A	[122] B
[63] B	[68] C⁻	[73] B	[123] B
[64] A	[69] A	[74] B	[124] B
[65] B	[70] A	[75] B	[125] A

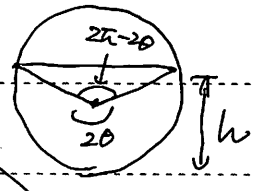
[67] $q=0$, $(\theta_1=0,\ \theta_2=\frac{\pi}{2})$ $(\theta_1=\frac{\pi}{2},\ \theta_2=\pi)$

[66] ① 支配断面 → 限界水深

② $E=\frac{v^2}{2g}+h=\frac{Q^2}{2gS^2}+h$

$$\frac{dE}{dh}=-\frac{Q^2}{gS^3}\frac{dS}{dh}+1=0$$

$$\therefore\ Q^2=\frac{gS^3}{\frac{dS}{d\theta}\cdot\frac{1}{\frac{dh}{d\theta}}}$$



$$S=\frac{1}{2}\left(\frac{D}{2}\right)^2 2\theta+\frac{1}{2}\left(\frac{D}{2}\right)^2\sin(2\pi-2\theta)$$

$$=\frac{D^2}{8}(2\theta-\sin 2\theta)$$

$$h=\frac{D}{2}(1-\cos\theta)$$

ここに代入.

$$\frac{dS}{d\theta}=\frac{D^2}{4}(1-\cos 2\theta)=\frac{D^2}{2}\sin^2\theta \quad (1-2\sin^2\theta)$$

$$\frac{dh}{d\theta}=\frac{D}{2}\sin\theta \quad \Rightarrow \text{肢5}//$$