6. The sides of a triangle are $\sin\alpha, \cos\alpha$ and $\sqrt{1+\sin\alpha\cos\alpha}$ for some $0<\alpha<\frac{\pi}{2}$. Then the greatest angle of the triangle is **[2004]**

(a) $150°$ (b) $90°$ (c) $120°$ (d) $60°$

Solution: -

6. **(c)** Let $a=\sin\alpha, b=\cos\alpha$ and $c=\sqrt{1+\sin\alpha\cos\alpha}$

Clearly a and $b<1$ but $c>1$ as $\sin\alpha>0$ and $\cos\alpha>0$

$\therefore c$ is the greatest side and greatest angle is C

$$\therefore \cos C=\frac{a^2+b^2-c^2}{2ab}$$

$$=\frac{\sin^2\alpha+\cos^2\alpha-1-\sin\alpha\cos\alpha}{2\sin\alpha\cos\alpha}=-\frac{1}{2}$$

$$\therefore C=120°$$