296 Trasforma l'espressione in funzione soltanto di $\tan\alpha$, sapendo che $\frac{\pi}{2} < \alpha < \pi$.

$$\frac{\sin^2\alpha + \cot\alpha - 1}{2\cot^2\alpha + \cos^2\alpha} \qquad \left[\frac{\tan\alpha(\tan^2\alpha - \tan\alpha + 1)}{3\tan^2\alpha + 2}\right]$$

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

$$\Rightarrow \tan^2\alpha + 1 = \frac{1}{\cos^2\alpha} \Rightarrow \boxed{\cos^2\alpha = \frac{1}{1+\tan^2\alpha}}$$

$$\tan^2\alpha = \frac{\sin^2\alpha}{1-\sin^2\alpha} \Rightarrow \frac{1}{\tan^2\alpha} = \frac{1-\sin^2\alpha}{\sin^2\alpha} = \frac{1}{\sin^2\alpha} - 1$$

$$\frac{1}{\sin^2\alpha} = \frac{1}{\tan^2\alpha} + 1 \Rightarrow \frac{1}{\sin^2\alpha} = \frac{1+\tan^2\alpha}{\tan^2\alpha}$$

$$\Rightarrow \boxed{\sin^2\alpha = \frac{\tan^2\alpha}{1+\tan^2\alpha}}$$

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

$$= \frac{\dfrac{\tan^3\alpha + 1 + \tan^2\alpha - (1+\tan^2\alpha)\tan\alpha}{\cancel{(1+\tan^2\alpha)}\cancel{\tan\alpha}}}{\dfrac{2(1+\tan^2\alpha) + \tan^2\alpha}{\cancel{(1+\tan^2\alpha)}\tan^{\cancel{2}}\alpha}} = \frac{\cancel{\tan^3\alpha} + 1 + \tan^2\alpha - \tan\alpha - \cancel{\tan^3\alpha}}{\dfrac{2 + 2\tan^2\alpha + \tan^2\alpha}{\tan\alpha}} =$$

$$= \frac{(1+\tan^2\alpha - \tan\alpha)\tan\alpha}{2 + 3\tan^2\alpha}$$

293 $\dfrac{\cot\alpha}{\sin\alpha} + \csc\alpha - \dfrac{\csc\alpha}{\tan\alpha} =$ $\left[\dfrac{1}{\sin\alpha}\right]$

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

414 $\sin(\alpha - 2\pi)\cot(-\alpha) + \sin\left(\alpha + \frac{3}{2}\pi\right)\cos(\alpha + 5\pi) + \sin^2(6\pi - \alpha) =$ $[1 - \cos\alpha]$

$$= \sin\alpha \cdot (-\cot\alpha) + \sin\left(\alpha + 2\pi - \frac{\pi}{2}\right)\cos(\alpha + \pi + 4\pi) + \sin^2(-\alpha) =$$

$$= \cancel{\sin\alpha} \cdot \left(-\frac{\cos\alpha}{\cancel{\sin\alpha}}\right) + \sin\left(\alpha - \frac{\pi}{2}\right) \cdot \cos(\alpha + \pi) + [-\sin\alpha]^2 =$$

$$= -\cos\alpha + \sin\left(-\left(\frac{\pi}{2} - \alpha\right)\right) \cdot (-\cos\alpha) + \sin^2\alpha =$$

$$= -\cos\alpha - \sin\left(\frac{\pi}{2} - \alpha\right) \cdot (-\cos\alpha) + \sin^2\alpha =$$

$$= -\cos\alpha - \cos\alpha \cdot (-\cos\alpha) + \sin^2\alpha =$$

$$= -\cos\alpha + \underbrace{\cos^2\alpha + \sin^2\alpha}_{1} = \boxed{1 - \cos\alpha}$$