

Exercice 1

1) Module et Argument de $z = \frac{1+j \tan(\varphi)}{1-j \tan(\varphi)}$

$$z = \frac{1+j \tan(\varphi)}{1-j \tan(\varphi)} = \frac{1+j + \frac{\sin(\varphi)}{\cos(\varphi)}}{1-j + \frac{\sin(\varphi)}{\cos(\varphi)}} = \frac{\cos(\varphi) + j \sin(\varphi)}{\cos(\varphi)} \cdot \frac{\cos(\varphi) - j \sin(\varphi)}{\cos(\varphi) - j \sin(\varphi)}$$

$$\text{Donc } z = \frac{\cos(\varphi) + j \sin(\varphi)}{\cos(\varphi) - j \sin(\varphi)} = \frac{e^{j\varphi}}{e^{-j\varphi}} = \underline{\underline{e^{2j\varphi}}}$$

Donc z a pour argument 2φ et son module est 1