DEVELOPPEMENTS EN SERIE ENTIERE (en 0) USUELS

MP 21-22

A CONNAITRE

$$\forall z \in \mathbb{C},\ \exp(z) = \sum_{n=0}^{+\infty} \frac{z^n}{n!}$$

$$\forall z \in \mathbb{C},\ \operatorname{ch} z = \sum_{n=0}^{+\infty} \frac{z^{2n}}{(2\,n)!} \qquad \forall z \in \mathbb{C},\ \operatorname{sh} z = \sum_{n=0}^{+\infty} \frac{z^{2n+1}}{(2\,n+1)!}$$

$$\forall z \in \mathbb{C},\ \cos z = \sum_{n=0}^{+\infty} \frac{(-1)^n\ z^{2n}}{(2\,n)!} \qquad \forall z \in \mathbb{C},\ \sin z = \sum_{n=0}^{+\infty} \frac{(-1)^n\ z^{2n+1}}{(2\,n+1)!}$$

$$\forall z \in \mathcal{D}_0(0,1),\ \frac{1}{1-z} = \sum_{n=0}^{+\infty} z^n$$

$$\forall p \in \mathbb{N},\ \forall z \in \mathcal{D}_0(0,1),\ \frac{1}{(1-z)^{p+1}} = \sum_{n=0}^{+\infty} \binom{n+p}{p} z^n = \sum_{n=p}^{+\infty} \binom{n}{p} z^{n-p}$$

$$\forall x \in \left]-1,+1\right],\ \ln(1+x) = \sum_{n=1}^{+\infty} \frac{(-1)^{n+1}}{n} x^n \qquad \forall x \in \left[-1,+1\right[,\ \ln(1-x) = -\sum_{n=1}^{+\infty} \frac{x^n}{n}$$

$$\forall x \in [-1,+1],\ \arctan x = \sum_{n=0}^{+\infty} \frac{(-1)^n}{2\,n+1} x^{2n+1}$$

$$\forall \alpha \in \mathbb{R},\ \forall x \in \left]-1,+1\right[,\ (1+x)^\alpha = 1 + \sum_{n=1}^{+\infty} \frac{\alpha(\alpha-1)\dots(\alpha-n+1)}{n!} x^n$$

$$\forall x \in \left]-1,+1\right[,\ \sqrt{1-x} = -\sum_{n=0}^{+\infty} \frac{(2\,n)!}{(2\,n-1)\ 2^{2n}\ (n!)^2} x^n \qquad \frac{1}{\sqrt{1-x}} = \sum_{n=0}^{+\infty} \frac{(2\,n)!}{2^{2n}\ (n!)^2} x^n$$

$$\forall x \in [-1,+1],\ \arcsin x = \sum_{n=0}^{+\infty} \frac{(2\,n)!}{(2\,n+1)\ 2^{2n}\ (n!)^2} x^{2n+1}$$