# ON APPROXIMATION OF THE POLAR FACTOR OF AN OPERATOR ON A HILBERT SPACE

MOSTAFA MBEKHTA

Let $H$ be a complex Hilbert space and let $\mathcal{B}(H)$ be the algebra of all bounded linear operators on $H$. The polar decomposition theorem asserts that every operator $T \in \mathcal{B}(H)$ can be written as the product $T = VP$ of a partial isometry $V \in \mathcal{B}(H)$ and a positive operator $P \in \mathcal{B}(H)$ such that the kernels of $V$ and $P$ coincide. Then this decomposition is unique. $V$ is called the polar factor of $T$. Moreover, we have automatically $P = |T| = (T^*T)^{\frac{1}{2}}$. Unlike $P$, we have no representation formula that is required for $V$. In this talk, we introduce, for $T \in \mathcal{B}(H)$, a family of functions called "polar-function" for $T$, such that the polar factor of $T$ is obtained as a limit of this family of functions. We derive several explicit formulas representing the polar factor. These formulas allow for methods of approximations of the polar factor of $T$.

Laboratoire Paul Painlevé, Université de Lille, France