# Pontificia Universidad Católica del Perú Escuela de Posgrado
# Doctorado en Matemáticas

**Variedades Complejas**
**TAREA 5**
2020-II

Indicaciones Generales:

- La TAREA 5 puede ser subida a la plataforma Paideia o enviada al correo electrónico jcuadros@pucp.edu.pe.

1. Consider a complex vector bundle $\pi : E \to M$ of rank $k$ over a complex manifold $M$. Let $g_{\alpha\beta}$ its transition functions for some cover $\{U_\alpha\}$. Show that a section $\sigma : M \to E$ of $E$ can be identified with a collection $\sigma_\alpha$ of smooth maps $\sigma_\alpha : U_\alpha \to \mathbb{C}^k$ satisfying $\sigma_\alpha = g_{\alpha\beta}\sigma_\beta$.

2. Consider a complex manifold $M$, show that any complex vector bundle $\pi : E \to M$ is holomorphic if and only $E$ is complex manifold with $\pi$ holomorphic.

3. Consider a complex manifold $M$, show that for any holomorphic vector bundle $\pi : E \to M$, its associated projective bundle $\mathbb{P}(E)$ is a complex manifold.