

# The Basics of Bergman Spaces

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## The Space $A^2(\Omega)$

**Definition 1.** Let  $\Omega \subseteq \mathbb{C}$  be a **domain** (i.e., an open, connected set). Define

$$A^2(\Omega) = \left\{ f \text{ holomorphic on } \Omega : \int_{\Omega} |f(z)|^2 dA(z) < \infty \right\} \subseteq L^2(\Omega)$$

where  $dA$  is the ordinary two-dimensional area measure. Then,  $A^2(\Omega)$  is a complex vector space, called the **Bergman space**.

- The **Bergman norm** is given by

$$\|f\|_{A^2(\Omega)} = \left[ \int_{\Omega} |f(z)|^2 dA(z) \right]^{1/2}.$$

- The standard inner product on  $A^2(\Omega)$  is defined by

$$\langle f, g \rangle = \int_{\Omega} f(z) \overline{g(z)} dA(z).$$

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