

## MEASURABLE SECTIONS

## Why

Toward a theory of iterated integrals, we need to know that set and function sections are measurable.

## Results

**Prop.** 1. Let (X, A) and (Y, B) be measurable spaces. For any  $E \in A \times B$ , the sections  $E_x$  and  $E^y$  are measurable for any  $x \in X$  and  $y \in Y$ .

Proof. TODO

**Prop. 2.** Let  $(X, \mathcal{A})$  and  $(Y, \mathcal{B})$  be measurable spaces. Let  $f: X \times Y \to F$ , where F is the extended real numbers or the complex numbers, and f is measurable (using the appropriate sigma algebra of the codomain). The sections  $f_x: Y \to F$  and  $f^y: X \to F$  are measurable for each  $x \in X$  and  $y \in Y$ .

Proof. TODO

