

$$Z$$

$$\downarrow h$$

$$\downarrow g$$

$$\downarrow X$$

$$\downarrow X \times Y \xrightarrow{\pi_1} X \times Y \xrightarrow{\pi_2} Y$$

$$f(z) \xleftarrow{\pi_1} h(z) = (f(z), g(z)) \xrightarrow{\pi_2} g(z)$$