Derived Category

1 Construction

> **Definition 1** (Derived category)**.** Let **A** be an abelian category. The *derived category* $\mathsf{D}(\mathbf{A})$ is defined by the following universal property: for any $\mathcal{H}\!om$ $\mathcal{H}\!om$ $\mathcal{E}\!xt$ ℓ $abcd$ $\mathfrak{p}$ $\Bbbk$ k . $\mathfrak{A}$, $\mathscr{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$ $abcdefghijklmnopqrstuvwxyz$ $\mathfrak{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$. $\mathfrak{abcdefghijklmnopqrstuvwxyz}$ $\mathcal{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$ $abcdefghijklmnopqrstuvwxyz$ $\mathbb{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$ $\mathtt{abcdefghijklmnopqrstuvwxyz}$. 1

> **Example 2** (Test of manually defined mathtools commands)**.** Here we test the commands we defined manually:
>
> The function is defined as:
> $$f(x) := \begin{cases} x^2 & \text{if } x \geq 0 \\ -x^2 & \text{if } x < 0 \\ 0 & \text{otherwise} \end{cases}$$
>
> This shows that both `\coloneqq` and the `dcases` environment work correctly without mathtools.