Big - O Notation

We write $f(x) = \Theta(u(x))$ as $x \longrightarrow a$ provided that

$$|f(x)| \leq K|u(x)|$$

holds for some constant K on some open interval containing $x = a$.

Similarly $f(x) = g(x) + \Theta(u(x))$ as $x \longrightarrow a$ if

$$f(x) - g(x) = \Theta(u(x)) \text{ as } x \longrightarrow a,$$

that is, if

$$|f(x) - g(x)| \leq K|u(x)| \text{ near } a$$