1 4.8: L'Hospital’s Rule

**Goal:** Given a limit of indeterminate form \((0/0, \infty/\infty, \text{etc.})\) with differentiable functions, find the limit.

**L’Hospital’s Rule:** If \(f\) and \(g\) are differentiable and \(g'(x) \neq 0\) for all \(x\) “near” \(a\), and \(\lim_{x \to a} f(x) = \lim_{x \to a} g(x) = 0\) or \(\lim_{x \to a} f(x) = \pm \infty\) and \(\lim_{x \to a} g(x) = \pm \infty\), then

**Examples:**

Find each of the following limits:

L'HOSPITAL'S RULE Maplet

\[
\lim_{x \to -\infty} xe^x
\]
Compute \( \lim_{x \to 0} (\cos x)^{1/x^2} \).

**On Beyond Average:** Recall the formula for computing compound interest (4.3): \( A = P \left( 1 + \frac{r}{m} \right)^{mt} \).

Find \( \lim_{m \to \infty} A \).