Please translate the following text from English to Serbian.

L'Hôpital's Rule (Proof) – Clean Notes Format

(Jonathan Kane – Writing Proofs in Analysis, 2015, p. 153)

Instruction

Please translate the following excerpt into English.

Excerpt

Now the Extended Mean Value Theorem can be used to give a correct proof of L'Hôpital's Rule.

L'Hôpital's Rule (Part 1)

Let f and g be functions differentiable for all $x \neq a$ in an open interval containing a.

Assume:

- $\lim x \to a\ f(x) = 0$
- $\lim x \to a\ g(x) = 0$
- $g'(x) \neq 0$ for all $x \neq a$

and assume:

- $\lim x \to a\ [f'(x) / g'(x)] = L$

Then:

- $\lim x \to a\ [f(x) / g(x)] = L$

Proof

• Let f and g be differentiable for all $x \neq a$ in an open interval containing a.

• Assume:

- $\lim x \to a\ f(x) = 0$
- $\lim x \to a\ g(x) = 0$
- $g'(x) \neq 0$ for all $x \neq a$

• Assume:

- $\lim x \to a \, f'(x)/g'(x) = L$

• Without loss of generality, assume $f(a) = g(a) = 0$, since redefining values at a does not affect limits.

• Then f and g are continuous at $x = a$.

• Let $\varepsilon > 0$ be given.

• Since $\lim x \to a \, f'(x)/g'(x) = L$, there exists $\delta > 0$ such that:
$0 < |x - a| < \delta \Rightarrow |f'(x)/g'(x) - L| < \varepsilon$

• Fix x with $0 < |x - a| < \delta$.

• On the interval between a and x, f and g are continuous and differentiable, so the Extended Mean Value Theorem applies.

• Therefore, there exists c between a and x such that:

$f'(c)[g(x) - g(a)] = g'(c)[f(x) - f(a)]$

• Since $g'(c) \neq 0$ and $g(x) - g(a) \neq 0$, we obtain:

$[f(x) - f(a)] / [g(x) - g(a)] = f'(c) / g'(c)$

• Hence:

$|f(x)/g(x) - L| = |f'(c)/g'(c) - L| < \varepsilon$

• Therefore:

$\lim x \to a \, f(x)/g(x) = L$

which proves the theorem.

Note

L'Hôpital's Rule also holds in cases where $\lim x \to a \, g(x)$ is infinite.

Formal Source Note

This is an excerpt adapted from:

Jonathan Kane,
Writing Proofs in Analysis,
Springer, 2015,
p. 153.

Assignment 2: Imune Dreams (Excerpt)

(Ian Watson – Immune Dreams, 1991, p. 119)

Instruction

Please translate the following text from English to Serbian.

Excerpt

“You realize you’re wrecking our relationship? Your scientific credibility too! If that matters to you!”

“My dreams have a shape to them. I have to… live them out.”

Correcting the trim of the machine, Mary spiraled the glider through the woolpack, avoiding entering cloud. They soared above the snow cocoons into open sky; the clouds swept by below them like detergent froth on rivers of the air—the vale and downs being the soft clefted base of this surge of translucent streams. They continued a stable upward helix for another few hundred feet till uplift weakened and Mary swung the machine away towards a thermal bubble on which another pilot was rising a mile away, in company with dark specks of swifts and swallows catching insects borne up along with the air.

But if they’d entered cloud, reflected Adrian, and if another pilot had also done so, and if the curves of the two gliders intersected in the woolly fog, then there’d have been… discontinuity: a catastrophe curve.

Marguerite Ponty accepted the infrared goggles back from Thibaud and Rosen to hang on the hook outside the second of two doors labeled *Défense d’éclairage!*

The slim woman’s dark glossy eyes were heavily accented by violet eye shadow, making them seem like vast pools; as though, having spent too many hours in null-light conditions tending the darkroom cats, her senses were beginning to adapt.

Her hair was short and spiky, gamine style. She wore dirty plimsolls, blue jeans, and a ragged sweater under her white lab coat, the loops of knitting pulled and unraveled by cats’ claws. From her ears hung magnificent golden Aztec pyramid earrings. Her scent was a strange mix of patchouli and cat urine: clotted sweetness and sour tartness fused together.

“The pons area is lesioned at one year old,” Thibaud commented. “They’ve never seen anything. Never met any other cat but their mother. Yet in their dreams they prowl the same basic genetic landscape. The computer tells us how they show the same choreography—only purified, abstracted. What is it, I wonder? A Paul Klee universe? A Kandinsky cosmos? Has anyone unwittingly painted the genetic icons?”