2. Operator 2 – Chronoceptive Window

"What you feel as now, given your past."

Now we formalize a Chronoceptional Dynamics operator.

2.1 Spaces & objects

Let be any state space (can be , or even your 4D space above).

A trajectory is a function

$$X : \mathbb{R} \to V,\quad t \mapsto x(t)$$

Let be the space of such trajectories (continuous, square-integrable, whatever regularity you want).

2.2 Parameters

A chronoceptive scale : how wide the felt "now-window" is.

A kernel (e.g. Gaussian, exponential) satisfying:

$$K_\tau(s) \ge 0,\quad \int_{-\infty}^{\infty} k_\tau(s)\,ds = 1,$$

Think: "how much weight you give to recent vs older moments."

2.3 Operator definition

Define the chronoceptive window operator:

$$C_\tau : \mathcal{X} \to \mathcal{X},\quad$$
$$(C_\tau x)(t) = \int_{-\infty}^{\infty} k_\tau(s)\, x(t - s)\, ds.$$

If you want "past only":

$$(C_\tau x)(t) = \int_0^\infty k_\tau(s)\, x(t - s)\, ds.$$

This turns the raw trajectory into the felt present: a smoothed, memory-weighted state.

2.4 Key properties

Linearity in : the integral is linear.

Time-translation invariance:

If , then

$$C_\tau x_\Delta (t) = (C_\tau x)(t+\Delta).$$

If is smooth and spread out, damps high-frequency changes — it literally blurs time.

Scale dependence:

Larger : longer "felt moment," heavier integration across time.

Smaller : near-instant, more spike-like.

2.5 Equivalence classes & perception

Define:

$X \sim^{(\tau)} y \iff C\_\tau x = C\_\tau y.$

Two trajectories are chronoceptively indistinguishable at scale if their chronoceptive images match.

At small : only very close trajectories are equivalent.

At large : different micro-histories can collapse into the same coarse "felt now".

This is directly usable in your framework:

Chronoception is literally a quotient of trajectory space by the kernel-induced equivalence relation.

Different correspond to different "zoom levels" of time experience.