# Project Theories and Formulas

## 1. Kern Formula

The Kern represents the central balancing point and connection among all modules. We approach it as a weighted average or equilibrium point influenced by each module’s output.  
  
Let’s denote:  
 - Y as the Yin-Yang balance output.  
 - P as the PESEBN module output.  
 - S as the SEG-RS module output.  
 - W\_Y, W\_P, W\_S as weights representing the influence of each module.  
  
Kern Formula:  
 Kern = (W\_Y \* Y + W\_P \* P + W\_S \* S) / (W\_Y + W\_P + W\_S)  
This formula assumes that each module contributes to the core equilibrium, and weights adjust the importance of each module.

## 2. Yin & Yang Module (Y&Y)

This module manages balance, moving towards 'Yin' or 'Yang' based on context. We represent it with a variable Y, where positive values indicate a shift towards Yang and negative values towards Yin.  
  
Formula:  
 Y = max(-45, min(45, Y + Δ))  
Where Δ is the adjustment based on context:  
 - Δ = -1 for Good/Light context,  
 - Δ = +1 for Bad/Dark context,  
 - Δ = -Y / k (where k is a decay constant) to gradually return Y to zero if no context is provided.

## 3. PESEBN Module

PESEBN focuses on primary and secondary needs with dynamic values depending on needs’ satisfaction. This module can be represented as a function P that outputs a value based on a matrix of needs fulfillment.  
  
Formula:  
 P = α \* sum(f(N\_p)) + β \* sum(f(N\_s))  
Where:  
 - α and β are weights for primary and secondary needs.  
 - N\_p represents primary needs and N\_s represents secondary needs.  
 - f(N) ranges from 0 to 1 and represents each need’s fulfillment.

## 4. SEG-RS Module

The SEG-RS module involves stimuli processing, evaluation, and response. Let’s denote:  
 - S as the stimulus intensity.  
 - E as evaluation (scored from -1 for negative to +1 for positive).  
 - R as the response (proportional to both stimulus and evaluation).  
  
Formula:  
 R = S \* E \* k  
Where k is a scaling factor. This module evaluates each stimulus-response pairing based on the nature of the evaluation.

## 5. Combined Interaction Formula

The total output is the combined effect of all modules, contributing to the system's overall “state.”  
  
Formula:  
 State = γ \* Kern + δ \* (Y + P + S)  
Where γ and δ adjust the emphasis on equilibrium (Kern) versus active module outputs. This formula allows flexibility in adjusting the system’s responsiveness and stability.