

# Plain-Speak Equation Jigsaw for the Minimal Conserved Recursive-Survival Sector

Companion decoding note

## How to Read This

This is a companion document for private editing. It lists the 86 displayed equation entries from the main minimal conserved Recursive-Survival sector note. Under each equation is a deliberately literal jigsaw made from notation-table meanings. Repeated symbols are kept when they reappear, because the goal is to let each equation be inspected piece by piece.

This is not meant to be polished prose. It is a decoding sheet.

An e-fold is a way of measuring cosmic expansion by how much the scale factor  $a$  has grown. Instead of using ordinary time  $t$ , cosmologists often use:

$$N = \ln a$$

So one e-fold means the universe's scale factor has multiplied by (euler's)  $e \approx 2.718$ .

It is useful because expansion equations often become cleaner when written "per amount of expansion" rather than "per second."

## Equation List

### Equation 01

$$N = \ln a.$$

**Plain-word jigsaw, in equation order:**

- $N$ : e-fold time
- $=$ : equals
- $\ln$ : natural logarithm
- $a$ : scale factor

### Equation 02

$$X' = \frac{dX}{dN} = \frac{1}{H} \frac{dX}{dt}.$$

**Plain-word jigsaw, in equation order:**

- $X'$ : e-fold derivative of any quantity  $X$
- $=$ : equals
- $\frac{}{}:$  fraction: numerator over denominator
- $\ddot{}:$  small-change differential
- $X$ : any quantity  $X$
- $\ddot{}:$  small-change differential
- $N$ : e-fold time
- $=$ : equals
- $\frac{}{}:$  fraction: numerator over denominator
- $1$ : number
- $H$ : Hubble rate
- $\frac{}{}:$  fraction: numerator over denominator
- $\ddot{}:$  small-change differential
- $X$ : any quantity  $X$
- $\ddot{}:$  small-change differential
- $t$ : cosmic time

### Equation 03

$$G_{\mu\nu} = 8\pi G (T_{\mu\nu} + T_{\mu\nu}^R).$$

#### Plain-word jigsaw, in equation order:

- $G_{\mu\nu}$ : Einstein curvature tensor
- $=$ : equals
- $8$ : number
- $\pi$ : circle constant pi
- $G$ : Newton gravitational constant
- $\left$ : left grouping marker
- $($ : open parenthesis
- $T_{\mu\nu}$ : ordinary stress-energy tensor
- $+$ : plus
- $T_{\mu\nu}^R$ : recursive-survival stress-energy tensor
- $\right$ : right grouping marker
- $)$ : close parenthesis

### Equation 04

$$\nabla_{\mu} (T^{\mu\nu} + T_R^{\mu\nu}) = 0.$$

#### Plain-word jigsaw, in equation order:

- `\nabla_{\mu}`: covariant derivative in spacetime direction mu
- `\left`: left grouping marker
- `(`: open parenthesis
- `T^{\mu\nu}`: ordinary stress-energy with raised indices
- `+`: plus
- `T_R^{\mu\nu}`: recursive-survival stress-energy with raised indices
- `\right`: right grouping marker
- `)`: close parenthesis
- `=`: equals
- `0`: number

### Equation 05

$$\nabla_{\mu} T^{\mu\nu} = Q^{\nu},$$

#### Plain-word jigsaw, in equation order:

- `\nabla_{\mu}`: covariant derivative in spacetime direction mu
- `T^{\mu\nu}`: ordinary stress-energy with raised indices
- `=`: equals
- `Q^{\nu}`: sector exchange current

### Equation 06

$$\nabla_{\mu} T_R^{\mu\nu} = -Q^{\nu}.$$

#### Plain-word jigsaw, in equation order:

- `\nabla_{\mu}`: covariant derivative in spacetime direction mu
- `T_R^{\mu\nu}`: recursive-survival stress-energy with raised indices
- `=`: equals
- `-`: minus
- `Q^{\nu}`: sector exchange current

### Equation 07

$$A = -\ln S,$$

#### Plain-word jigsaw, in equation order:

- A: accumulated survival loss
- =: equals
- -: minus
- $\ln$ : natural logarithm
- S: survival weight

### Equation 08

$$A = \int \Gamma W \, d\tau,$$

#### Plain-word jigsaw, in equation order:

- A: accumulated survival loss
- =: equals
- $\int$ : integral
- $\Gamma W$ : effective survival-loss exposure
- $d$ : small-change differential
- $\tau$ : proper time or path time

### Equation 09

$$s_\mu = \nabla_\mu A$$

#### Plain-word jigsaw, in equation order:

- $s_\mu$ : survival-exposure gradient
- =: equals
- $\nabla_\mu$ : covariant derivative in spacetime direction  $\mu$
- A: accumulated survival loss

## Equation 10

$$T_{\mu\nu}^R = T_{\mu\nu}^R [A, s_\mu, C, \text{boundary stability, closure diagnostics, } g_{\mu\nu}].$$

### Plain-word jigsaw, in equation order:

- `\TR_{\mu\nu}`: recursive-survival stress-energy tensor
- `=`: equals
- `\TR_{\mu\nu}`: recursive-survival stress-energy tensor
- `\left`: left grouping marker
- `[`: open bracket
- `A`: accumulated survival loss
- `s_{\mu}`: survival-exposure gradient
- `C`: coherence memory
- `\hbox{boundary stability}`: plain-language condition written inside the equation
- `\hbox{closure diagnostics}`: plain-language condition written inside the equation
- `g_{\mu\nu}`: spacetime metric
- `\right`: right grouping marker
- `]`: close bracket

## Equation 11

$$\mathcal{E} = \frac{dA}{dN} = \frac{\Gamma W}{H}.$$

### Plain-word jigsaw, in equation order:

- `\mathcal{E}`: dimensionless exposure per e-fold
- `=`: equals
- `\frac`: fraction: numerator over denominator
- `\dd`: small-change differential
- `A`: accumulated survival loss
- `\dd`: small-change differential
- `N`: e-fold time
- `=`: equals
- `\frac`: fraction: numerator over denominator
- `\Gamma W`: effective survival-loss exposure
- `H`: Hubble rate

## Equation 12

$$ds^2 = -dt^2 + a(t)^2 \delta_{ij} dx^i dx^j.$$

### Plain-word jigsaw, in equation order:

- `\dd`: small-change differential
- `^2`: raised index or power
- `2`: number
- `=`: equals
- `-`: minus
- `\dd`: small-change differential
- `t`: cosmic time
- `^2`: squared
- `+`: plus
- `a(t)`: scale factor as a function of cosmic time
- `^2`: squared
- `\delta_{ij}`: flat spatial metric symbol
- `\dd`: small-change differential
- `^i`: raised index or power
- `i`: spatial index i
- `\dd`: small-change differential
- `^j`: raised index or power
- `j`: spatial index j

## Equation 13

$$T^{\mu\nu} = (\rho + p)u^\mu u^\nu + pg^{\mu\nu},$$

### Plain-word jigsaw, in equation order:

- `T^{\mu\nu}`: ordinary stress-energy with raised indices
- `=`: equals
- `(`: open parenthesis
- `\rho`: ordinary density
- `+`: plus

- p: ordinary pressure
- ): close parenthesis
- $u^\mu$ : cosmological four-velocity
- $u^\nu$ : cosmological four-velocity
- +: plus
- p: ordinary pressure
- $g^{\mu\nu}$ : inverse spacetime metric

### Equation 14

$$T_R^{\mu\nu} = (\rho_R + p_R)u^\mu u^\nu + p_R g^{\mu\nu}.$$

#### Plain-word jigsaw, in equation order:

- $T_R^{\mu\nu}$ : recursive-survival stress-energy with raised indices
- =: equals
- (: open parenthesis
- $\rho_R$ : recursive density
- +: plus
- $p_R$ : recursive pressure
- ): close parenthesis
- $u^\mu$ : cosmological four-velocity
- $u^\nu$ : cosmological four-velocity
- +: plus
- $p_R$ : recursive pressure
- $g^{\mu\nu}$ : inverse spacetime metric

### Equation 15

$$p = w\rho, \quad p_R = w_R\rho_R.$$

#### Plain-word jigsaw, in equation order:

- p: ordinary pressure
- =: equals
- w: ordinary equation-of-state parameter
- $\rho$ : ordinary density

- `p_R`: recursive pressure
- `=`: equals
- `w_R`: recursive equation-of-state parameter
- `\rho_R`: recursive density

### Equation 16

$$H^2 = \frac{8\pi G}{3} (\rho + \rho_R).$$

#### Plain-word jigsaw, in equation order:

- `H`: Hubble rate
- `^2`: squared
- `=`: equals
- `\frac`: fraction: numerator over denominator
- `8`: number
- `\pi`: circle constant pi
- `G`: Newton gravitational constant
- `3`: number
- `\left`: left grouping marker
- `(`: open parenthesis
- `\rho`: ordinary density
- `+`: plus
- `\rho_R`: recursive density
- `\right`: right grouping marker
- `)`: close parenthesis

### Equation 17

$$\rho \longrightarrow \rho_r + \rho_b + \rho_c + \rho_\Lambda,$$

#### Plain-word jigsaw, in equation order:

- `\rho`: ordinary density
- `\longrightarrow`: tends toward or is replaced by
- `\rho_r`: radiation density
- `+`: plus

- $\rho_b$ : baryon density
- +: plus
- $\rho_c$ : cold dark matter density
- +: plus
- $\rho_\Lambda$ : vacuum density

### Equation 18

$$Q^\nu = \Xi u^\nu.$$

#### Plain-word jigsaw, in equation order:

- $Q^\nu$ : sector exchange current
- =: equals
- $\Xi$ : exchange scalar
- $u^\nu$ : cosmological four-velocity

### Equation 19

$$\Xi > 0 \iff \text{recursive-sector density is transferred into the ordinary sector.}$$

#### Plain-word jigsaw, in equation order:

- $\Xi$ : exchange scalar
- >: greater than
- 0: number
- $\Longleftrightarrow$ : if and only if / means equivalently
- $\boxed{\text{recursive-sector density is transferred into the ordinary sector}}$ : plain-language condition written inside the equation

### Equation 20

$$\dot{\rho} + 3H(1 + w)\rho = +\Xi,$$

#### Plain-word jigsaw, in equation order:

- $\dot{\rho}$ : time derivative of ordinary density
- +: plus
- 3: number
- H: Hubble rate
- (: open parenthesis

- 1: number
- +: plus
- w: ordinary equation-of-state parameter
- ): close parenthesis
- \rho: ordinary density
- =: equals
- +: plus
- \Xi: exchange scalar

### Equation 21

$$\dot{\rho}_R + 3H(1 + w_R)\rho_R = -\Xi.$$

### Plain-word jigsaw, in equation order:

- \dot{\rho}\_R: time derivative of recursive density
- +: plus
- 3: number
- H: Hubble rate
- (: open parenthesis
- 1: number
- +: plus
- w\_R: recursive equation-of-state parameter
- ): close parenthesis
- \rho\_R: recursive density
- =: equals
- -: minus
- \Xi: exchange scalar

## Equation 22

$$\dot{\rho}_{\text{tot}} + 3H [(1 + w)\rho + (1 + w_R)\rho_R] = 0,$$

### Plain-word jigsaw, in equation order:

- `\dot{\rho}_{\text{tot}}`: time derivative of total density
- `+`: plus
- `3`: number
- `H`: Hubble rate
- `\left`: left grouping marker
- `[`: open bracket
- `(`: open parenthesis
- `1`: number
- `+`: plus
- `w`: ordinary equation-of-state parameter
- `)`: close parenthesis
- `\rho`: ordinary density
- `+`: plus
- `(`: open parenthesis
- `1`: number
- `+`: plus
- `w_R`: recursive equation-of-state parameter
- `)`: close parenthesis
- `\rho_R`: recursive density
- `\right`: right grouping marker
- `]`: close bracket
- `=`: equals
- `0`: number

### Equation 23

$$\Xi = \alpha_R C H \rho_R$$

Plain-word jigsaw, in equation order:

- `\boxed`: boxed important expression
- `\Xi`: exchange scalar
- `=`: equals
- `\alpha_R`: minimal exchange strength
- `C`: coherence memory
- `H`: Hubble rate
- `\rho_R`: recursive density

### Equation 24

$$\alpha_R = 0, \quad C = 0, \quad \rho_R = 0.$$

Plain-word jigsaw, in equation order:

- `\alpha_R`: minimal exchange strength
- `=`: equals
- `0`: number
- `C`: coherence memory
- `=`: equals
- `0`: number
- `\rho_R`: recursive density
- `=`: equals
- `0`: number

### Equation 25

$$\frac{\Xi}{H \rho_R} = \alpha_R C.$$

Plain-word jigsaw, in equation order:

- `\boxed`: boxed important expression
- `\frac`: fraction: numerator over denominator
- `\Xi`: exchange scalar
- `H`: Hubble rate

- $\rho_R$ : recursive density
- $=$ : equals
- $\alpha_R$ : minimal exchange strength
- $C$ : coherence memory

### Equation 26

$$\Xi = \alpha_0 C \mathcal{E} H \rho_R,$$

#### Plain-word jigsaw, in equation order:

- $\xi$ : exchange scalar
- $=$ : equals
- $\alpha_0$ : bare exposure coupling
- $C$ : coherence memory
- $\mathcal{E}$ : dimensionless exposure per e-fold
- $H$ : Hubble rate
- $\rho_R$ : recursive density

### Equation 27

$$\alpha_R \equiv \alpha_0 \mathcal{E}_{\text{eff}}.$$

#### Plain-word jigsaw, in equation order:

- $\alpha_R$ : minimal exchange strength
- $\equiv$ : is defined as
- $\alpha_0$ : bare exposure coupling
- $\mathcal{E}_{\text{eff}}$ : effective exposure value

### Equation 28

$$\dot{C} = H [-\gamma_C C + \eta \Omega_R (1 - C)],$$

#### Plain-word jigsaw, in equation order:

- $\dot{C}$ : time derivative of coherence memory
- $=$ : equals
- $H$ : Hubble rate
- $\left$ : left grouping marker
- $[$ : open bracket

- -: minus
- `\gamma_C`: coherence decay per e-fold
- `C`: coherence memory
- +: plus
- `\eta`: coherence source strength
- `\Omega_R`: recursive density fraction
- (: open parenthesis
- 1: number
- -: minus
- `C`: coherence memory
- ): close parenthesis
- `\right`: right grouping marker
- ]: close bracket

### Equation 29

$$\Omega_R = \frac{\rho_R}{\rho + \rho_R}.$$

#### Plain-word jigsaw, in equation order:

- `\Omega_R`: recursive density fraction
- =: equals
- `\frac`: fraction: numerator over denominator
- `\rho_R`: recursive density
- `\rho`: ordinary density
- +: plus
- `\rho_R`: recursive density

### Equation 30

$$\boxed{C' = -\gamma_C C + \eta \Omega_R (1 - C)}.$$

#### Plain-word jigsaw, in equation order:

- `\boxed`: boxed important expression
- `C'`: e-fold derivative of coherence memory
- =: equals

- -: minus
- $\backslash\gamma_C$ : coherence decay per e-fold
- C: coherence memory
- +: plus
- $\backslash\eta$ : coherence source strength
- $\backslash\Omega_R$ : recursive density fraction
- (: open parenthesis
- 1: number
- -: minus
- C: coherence memory
- ): close parenthesis

### Equation 31

$$\gamma_C \geq 0, \quad \eta \geq 0, \quad 0 \leq \Omega_R \leq 1,$$

### Plain-word jigsaw, in equation order:

- $\backslash\gamma_C$ : coherence decay per e-fold
- $\backslash\ge$ : greater than or equal to
- 0: number
- $\backslash\eta$ : coherence source strength
- $\backslash\ge$ : greater than or equal to
- 0: number
- 0: number
- $\backslash\le$ : less than or equal to
- $\backslash\Omega_R$ : recursive density fraction
- $\backslash\le$ : less than or equal to
- 1: number

### Equation 32

$$C' = \eta\Omega_R \geq 0,$$

#### Plain-word jigsaw, in equation order:

- $C'$ : e-fold derivative of coherence memory
- $=$ : equals
- $\eta$ : coherence source strength
- $\Omega_R$ : recursive density fraction
- $\geq$ : greater than or equal to
- 0: number

### Equation 33

$$C' = -\gamma_C \leq 0,$$

#### Plain-word jigsaw, in equation order:

- $C'$ : e-fold derivative of coherence memory
- $=$ : equals
- $-$ : minus
- $\gamma_C$ : coherence decay per e-fold
- $\leq$ : less than or equal to
- 0: number

### Equation 34

$$C_*(\Omega_R) = \frac{\eta\Omega_R}{\gamma_C + \eta\Omega_R}.$$

#### Plain-word jigsaw, in equation order:

- $C_*$ : instantaneous coherence equilibrium
- $($ : open parenthesis
- $\Omega_R$ : recursive density fraction
- $)$ : close parenthesis
- $=$ : equals
- $\frac{\eta\Omega_R}{\gamma_C + \eta\Omega_R}$ : fraction: numerator over denominator
- $\eta$ : coherence source strength
- $\Omega_R$ : recursive density fraction

- $\backslash\text{gamma}_C$ : coherence decay per e-fold
- +: plus
- $\backslash\text{eta}$ : coherence source strength
- $\backslash\text{OmR}$ : recursive density fraction

### Equation 35

$$\rho' + 3(1 + w)\rho = +\alpha_R C \rho_R,$$

#### Plain-word jigsaw, in equation order:

- $\backslash\text{rho}'$ : e-fold derivative of ordinary density
- +: plus
- 3: number
- (: open parenthesis
- 1: number
- +: plus
- w: ordinary equation-of-state parameter
- ): close parenthesis
- $\backslash\text{rho}$ : ordinary density
- =: equals
- +: plus
- $\backslash\text{alpha}_R$ : minimal exchange strength
- C: coherence memory
- $\backslash\text{rhoR}$ : recursive density

### Equation 36

$$\rho'_R + 3(1 + w_R)\rho_R = -\alpha_R C \rho_R,$$

#### Plain-word jigsaw, in equation order:

- $\backslash\text{rho}_R'$ : e-fold derivative of recursive density
- +: plus
- 3: number
- (: open parenthesis
- 1: number

- +: plus
- $w_R$ : recursive equation-of-state parameter
- ): close parenthesis
- $\rho_R$ : recursive density
- =: equals
- -: minus
- $\alpha_R$ : minimal exchange strength
- C: coherence memory
- $\rho_R$ : recursive density

### Equation 37

$$C' = -\gamma_C C + \eta \Omega_R (1 - C).$$

### Plain-word jigsaw, in equation order:

- C': e-fold derivative of coherence memory
- =: equals
- -: minus
- $\gamma_C$ : coherence decay per e-fold
- C: coherence memory
- +: plus
- $\eta$ : coherence source strength
- $\Omega_R$ : recursive density fraction
- (: open parenthesis
- 1: number
- -: minus
- C: coherence memory
- ): close parenthesis

### Equation 38

$$\rho'_R = - [3(1 + w_R) + \alpha_R C] \rho_R$$

#### Plain-word jigsaw, in equation order:

- `\boxed`: boxed important expression
- `\rho_R'`: e-fold derivative of recursive density
- `=`: equals
- `-`: minus
- `\left`: left grouping marker
- `[`: open bracket
- `3`: number
- `(`: open parenthesis
- `1`: number
- `+`: plus
- `w_R`: recursive equation-of-state parameter
- `)`: close parenthesis
- `+`: plus
- `\alpha_R`: minimal exchange strength
- `C`: coherence memory
- `\right`: right grouping marker
- `]`: close bracket
- `\rho_R`: recursive density

### Equation 39

$$\Omega'_R = \Omega_R [3(w - w_R)(1 - \Omega_R) - \alpha_R C].$$

#### Plain-word jigsaw, in equation order:

- `\boxed`: boxed important expression
- `\Omega_R'`: e-fold derivative of recursive density fraction
- `=`: equals
- `\Omega_R`: recursive density fraction
- `\left`: left grouping marker

- [: open bracket
- 3: number
- (: open parenthesis
- w: ordinary equation-of-state parameter
- -: minus
- w\_R: recursive equation-of-state parameter
- ): close parenthesis
- (: open parenthesis
- 1: number
- -: minus
- \Omega\_R: recursive density fraction
- ): close parenthesis
- -: minus
- \alpha\_R: minimal exchange strength
- C: coherence memory
- \right: right grouping marker
- ]: close bracket

#### Equation 40

$$C' = -\gamma_C C + \eta \Omega_R (1 - C).$$

#### Plain-word jigsaw, in equation order:

- \boxed: boxed important expression
- C': e-fold derivative of coherence memory
- =: equals
- -: minus
- \gamma\_C: coherence decay per e-fold
- C: coherence memory
- +: plus
- \eta: coherence source strength
- \Omega\_R: recursive density fraction

- (: open parenthesis
- 1: number
- -: minus
- C: coherence memory
- ): close parenthesis

### Equation 41

$$\frac{H'}{H} = -\frac{3}{2} [1 + w(1 - \Omega_R) + w_R \Omega_R].$$

### Plain-word jigsaw, in equation order:

- \boxed: boxed important expression
- \frac: fraction: numerator over denominator
- H': e-fold derivative of Hubble rate
- H: Hubble rate
- =: equals
- -: minus
- \frac: fraction: numerator over denominator
- 3: number
- 2: number
- \left: left grouping marker
- [: open bracket
- 1: number
- +: plus
- w: ordinary equation-of-state parameter
- (: open parenthesis
- 1: number
- -: minus
- \Omega\_R: recursive density fraction
- ): close parenthesis
- +: plus

- `w_R`: recursive equation-of-state parameter
- `\Omega_R`: recursive density fraction
- `\right`: right grouping marker
- `]`: close bracket

### Equation 42

$$w_{\text{eff}}(N) = w(1 - \Omega_R) + w_R\Omega_R.$$

#### Plain-word jigsaw, in equation order:

- `\boxed`: boxed important expression
- `w_{\text{eff}}`: effective equation of state
- `(`: open parenthesis
- `N`: e-fold time
- `)`: close parenthesis
- `=`: equals
- `w`: ordinary equation-of-state parameter
- `(`: open parenthesis
- `1`: number
- `-`: minus
- `\Omega_R`: recursive density fraction
- `)`: close parenthesis
- `+`: plus
- `w_R`: recursive equation-of-state parameter
- `\Omega_R`: recursive density fraction

### Equation 43

$$\Xi = \alpha_R C H \rho_R,$$

#### Plain-word jigsaw, in equation order:

- `\boxed`: boxed important expression
- `\Xi`: exchange scalar
- `=`: equals
- `\alpha_R`: minimal exchange strength

- C: coherence memory
- H: Hubble rate
- $\rho_R$ : recursive density

#### Equation 44

$$C' = -\gamma_C C + \eta \Omega_R (1 - C),$$

#### Plain-word jigsaw, in equation order:

- $\boxed{}$ : boxed important expression
- C': e-fold derivative of coherence memory
- =: equals
- -: minus
- $\gamma_C$ : coherence decay per e-fold
- C: coherence memory
- +: plus
- $\eta$ : coherence source strength
- $\Omega_R$ : recursive density fraction
- (: open parenthesis
- 1: number
- -: minus
- C: coherence memory
- ): close parenthesis

#### Equation 45

$$\Omega'_R = \Omega_R [3(w - w_R)(1 - \Omega_R) - \alpha_R C],$$

#### Plain-word jigsaw, in equation order:

- $\boxed{}$ : boxed important expression
- $\Omega'_R$ : e-fold derivative of recursive density fraction
- =: equals
- $\Omega_R$ : recursive density fraction
- $\left[$ : left grouping marker
- [: open bracket

- 3: number
- (: open parenthesis
- w: ordinary equation-of-state parameter
- -: minus
- w\_R: recursive equation-of-state parameter
- ): close parenthesis
- (: open parenthesis
- 1: number
- -: minus
- \Omega\_R: recursive density fraction
- ): close parenthesis
- -: minus
- \alpha\_R: minimal exchange strength
- C: coherence memory
- \right: right grouping marker
- ]: close bracket

### Equation 46

$$\frac{H'}{H} = -\frac{3}{2} [1 + w(1 - \Omega_R) + w_R \Omega_R].$$

### Plain-word jigsaw, in equation order:

- \boxed: boxed important expression
- \frac: fraction: numerator over denominator
- H': e-fold derivative of Hubble rate
- H: Hubble rate
- =: equals
- -: minus
- \frac: fraction: numerator over denominator
- 3: number
- 2: number

- `\left`: left grouping marker
- `[`: open bracket
- `1`: number
- `+`: plus
- `w`: ordinary equation-of-state parameter
- `(`: open parenthesis
- `1`: number
- `-`: minus
- `\Omega_R`: recursive density fraction
- `)`: close parenthesis
- `+`: plus
- `w_R`: recursive equation-of-state parameter
- `\Omega_R`: recursive density fraction
- `\right`: right grouping marker
- `]`: close bracket

### Equation 47

$$\alpha_R \geq 0, \quad \gamma_C > 0, \quad \eta \geq 0, \quad 0 \leq C_0 \leq 1, \quad \rho_0, \rho_{R0} \geq 0.$$

### Plain-word jigsaw, in equation order:

- `\alpha_R`: minimal exchange strength
- `\ge`: greater than or equal to
- `0`: number
- `\gamma_C`: coherence decay per e-fold
- `>`: greater than
- `0`: number
- `\eta`: coherence source strength
- `\ge`: greater than or equal to
- `0`: number
- `0`: number
- `\le`: less than or equal to

- `C_0`: initial coherence memory
- `\le`: less than or equal to
- `1`: number
- `\rho`: ordinary density
- `_0`: subscript marker
- `\rho`: ordinary density
- `_{R0}`: subscript marker
- `\ge`: greater than or equal to
- `0`: number

### Equation 48

$$\rho_R(N) = \rho_R(N_0) \exp \left[ - \int_{N_0}^N (3(1 + w_R) + \alpha_R C) dN \right].$$

### Plain-word jigsaw, in equation order:

- `\rho_R`: recursive density
- `(`: open parenthesis
- `N`: e-fold time
- `)`: close parenthesis
- `=`: equals
- `\rho_R`: recursive density
- `(`: open parenthesis
- `N_0`: reference e-fold
- `)`: close parenthesis
- `\exp`: exponential function
- `\left`: left grouping marker
- `[`: open bracket
- `-`: minus
- `\int_{N_0}^N`: definite integral over the shown limits
- `\left`: left grouping marker
- `(`: open parenthesis
- `3`: number

- (: open parenthesis
- 1: number
- +: plus
- w\_R: recursive equation-of-state parameter
- ): close parenthesis
- +: plus
- \alpha\_R: minimal exchange strength
- C: coherence memory
- \right: right grouping marker
- ): close parenthesis
- \dd: small-change differential
- N: e-fold time
- \right: right grouping marker
- ]: close bracket

### Equation 49

$$\Omega_R \rightarrow 0, \quad C \rightarrow 0, \quad \alpha_R C \rightarrow 0.$$

#### Plain-word jigsaw, in equation order:

- \Omega\_R: recursive density fraction
- \rightarrow: tends toward or is replaced by
- 0: number
- C: coherence memory
- \rightarrow: tends toward or is replaced by
- 0: number
- \alpha\_R: minimal exchange strength
- C: coherence memory
- \rightarrow: tends toward or is replaced by
- 0: number

## Equation 50

$$\rho' = -3(1+w)\rho + \alpha_R C \rho_R,$$

### Plain-word jigsaw, in equation order:

- $\rho'$ : e-fold derivative of ordinary density
- =: equals
- -: minus
- 3: number
- (: open parenthesis
- 1: number
- +: plus
- w: ordinary equation-of-state parameter
- ): close parenthesis
- $\rho$ : ordinary density
- +: plus
- $\alpha_R$ : minimal exchange strength
- C: coherence memory
- $\rho_R$ : recursive density

## Equation 51

$$\rho' \Big|_{\rho=0} = \alpha_R C \rho_R \geq 0$$

### Plain-word jigsaw, in equation order:

- $\rho'$ : e-fold derivative of ordinary density
- $_{\rho=0}$ : subscript marker
- i: spatial index i
- $_{\rho=0}$ : subscript marker
- $_{\rho=0}$ : subscript marker
- =: equals
- $\alpha_R$ : minimal exchange strength
- C: coherence memory
- $\rho_R$ : recursive density
- $\geq$ : greater than or equal to
- 0: number

### Equation 52

$$\Omega_R = 0, \quad \Omega_R = 1.$$

#### Plain-word jigsaw, in equation order:

- $\Omega_R$ : recursive density fraction
- =: equals
- 0: number
- $\Omega_R$ : recursive density fraction
- =: equals
- 1: number

### Equation 53

$$\Omega'_R = -\alpha_R C \leq 0.$$

#### Plain-word jigsaw, in equation order:

- $\Omega'_R$ : e-fold derivative of recursive density fraction
- =: equals
- -: minus
- $\alpha_R$ : minimal exchange strength
- C: coherence memory
- $\leq$ : less than or equal to
- 0: number

### Equation 54

$$\frac{\Xi}{H\rho_R} = \alpha_R C.$$

#### Plain-word jigsaw, in equation order:

- $\frac{\Xi}{H\rho_R}$ : fraction: numerator over denominator
- $\Xi$ : exchange scalar
- H: Hubble rate
- $\rho_R$ : recursive density
- =: equals
- $\alpha_R$ : minimal exchange strength
- C: coherence memory

### Equation 55

$$\Omega'_R = 3(w - w_R)\Omega_R(1 - \Omega_R).$$

#### Plain-word jigsaw, in equation order:

- $\Omega'_R$ : e-fold derivative of recursive density fraction
- =: equals
- 3: number
- (: open parenthesis
- w: ordinary equation-of-state parameter
- -: minus
- $w_R$ : recursive equation-of-state parameter
- ): close parenthesis
- $\Omega_R$ : recursive density fraction
- (: open parenthesis
- 1: number
- -: minus
- $\Omega_R$ : recursive density fraction
- ): close parenthesis

### Equation 56

$$C \approx C_*(\Omega_R) = \frac{\eta\Omega_R}{\gamma_C + \eta\Omega_R}.$$

#### Plain-word jigsaw, in equation order:

- C: coherence memory
- $\approx$ : approximately equals
- $C_*$ : instantaneous coherence equilibrium
- (: open parenthesis
- $\Omega_R$ : recursive density fraction
- ): close parenthesis
- =: equals
- $\frac{\eta\Omega_R}{\gamma_C + \eta\Omega_R}$ : fraction: numerator over denominator
- $\eta$ : coherence source strength

- `\Omega_R`: recursive density fraction
- `\gamma_C`: coherence decay per e-fold
- `+`: plus
- `\eta`: coherence source strength
- `\Omega_R`: recursive density fraction

### Equation 57

$$\Omega'_R \approx \Omega_R \left[ 3(w - w_R)(1 - \Omega_R) - \alpha_R \frac{\eta \Omega_R}{\gamma_C + \eta \Omega_R} \right].$$

### Plain-word jigsaw, in equation order:

- `\Omega_R'`: e-fold derivative of recursive density fraction
- `\approx`: approximately equals
- `\Omega_R`: recursive density fraction
- `\left`: left grouping marker
- `[`: open bracket
- `3`: number
- `(`: open parenthesis
- `w`: ordinary equation-of-state parameter
- `-`: minus
- `w_R`: recursive equation-of-state parameter
- `)`: close parenthesis
- `(`: open parenthesis
- `1`: number
- `-`: minus
- `\Omega_R`: recursive density fraction
- `)`: close parenthesis
- `-`: minus
- `\alpha_R`: minimal exchange strength
- `\frac`: fraction: numerator over denominator
- `\eta`: coherence source strength
- `\Omega_R`: recursive density fraction

- `\gamma_C`: coherence decay per e-fold
- `+`: plus
- `\eta`: coherence source strength
- `\Omega_R`: recursive density fraction
- `\right`: right grouping marker
- `]`: close bracket

### Equation 58

$$C\Omega_R,$$

Plain-word jigsaw, in equation order:

- `C`: coherence memory
- `\Omega_R`: recursive density fraction

### Equation 59

$$\alpha_R C,$$

Plain-word jigsaw, in equation order:

- `\alpha_R`: minimal exchange strength
- `C`: coherence memory

### Equation 60

$$\boxed{\mathcal{M}' = s_R C \Omega_R \mathcal{M}}.$$

Plain-word jigsaw, in equation order:

- `\boxed`: boxed important expression
- `\mathcal{M}'`: e-fold derivative of toy maturation index
- `=`: equals
- `s_R`: maturation response coefficient
- `C`: coherence memory
- `\Omega_R`: recursive density fraction
- `\mathcal{M}`: toy maturation index

## Equation 61

$$\mathcal{M}' = s_R C \Omega_R \mathcal{E} \mathcal{M}.$$

### Plain-word jigsaw, in equation order:

- `\boxed`: boxed important expression
- `\mathcal{M}'`: e-fold derivative of toy maturation index
- `=`: equals
- `s_R`: maturation response coefficient
- `C`: coherence memory
- `\Omega_R`: recursive density fraction
- `\mathcal{E}`: dimensionless exposure per e-fold
- `\mathcal{M}`: toy maturation index

## Equation 62

$$\frac{\mathcal{M}(N)}{\mathcal{M}(N_0)} = \exp \left[ s_R \int_{N_0}^N C(\tilde{N}) \Omega_R(\tilde{N}) d\tilde{N} \right].$$

### Plain-word jigsaw, in equation order:

- `\frac`: fraction: numerator over denominator
- `\mathcal{M}`: toy maturation index
- `(`: open parenthesis
- `N`: e-fold time
- `)`: close parenthesis
- `\mathcal{M}`: toy maturation index
- `(`: open parenthesis
- `N_0`: reference e-fold
- `)`: close parenthesis
- `=`: equals
- `\exp`: exponential function
- `\left`: left grouping marker
- `[`: open bracket
- `s_R`: maturation response coefficient
- `\int_{N_0}^N`: definite integral over the shown limits

- C: coherence memory
- (: open parenthesis
- \tilde N: dummy e-fold integration variable
- ): close parenthesis
- \Omega\_R: recursive density fraction
- (: open parenthesis
- \tilde N: dummy e-fold integration variable
- ): close parenthesis
- \dd: small-change differential
- \tilde N: dummy e-fold integration variable
- \right: right grouping marker
- ]: close bracket

### Equation 63

$$\Omega_R(N_i) = \Omega_{R,i}, \quad C(N_i) = C_i, \quad H(N_i) = H_i,$$

### Plain-word jigsaw, in equation order:

- \Omega\_R: recursive density fraction
- (: open parenthesis
- N\_i: initial e-fold
- ): close parenthesis
- =: equals
- \Omega\_{R,i}: initial recursive density fraction
- C: coherence memory
- (: open parenthesis
- N\_i: initial e-fold
- ): close parenthesis
- =: equals
- C\_i: initial coherence memory
- H: Hubble rate
- (: open parenthesis

- $N_i$ : initial e-fold
- $)$ : close parenthesis
- $=$ : equals
- $H_i$ : initial Hubble rate

### Equation 64

$$\Theta = \{\alpha_R, \gamma_C, \eta, w, w_R\}.$$

#### Plain-word jigsaw, in equation order:

- $\Theta$ : parameter set
- $=$ : equals
- $\{$ : open set brace
- $\alpha_R$ : minimal exchange strength
- $\gamma_C$ : coherence decay per e-fold
- $\eta$ : coherence source strength
- $w$ : ordinary equation-of-state parameter
- $w_R$ : recursive equation-of-state parameter
- $\}$ : close set brace

### Equation 65

$$\Omega'_R = \Omega_R [3(w - w_R)(1 - \Omega_R) - \alpha_R C],$$

#### Plain-word jigsaw, in equation order:

- $\Omega'_R$ : e-fold derivative of recursive density fraction
- $=$ : equals
- $\Omega_R$ : recursive density fraction
- $\left$ : left grouping marker
- $[$ : open bracket
- $3$ : number
- $($ : open parenthesis
- $w$ : ordinary equation-of-state parameter
- $-$ : minus
- $w_R$ : recursive equation-of-state parameter

- ): close parenthesis
- (: open parenthesis
- 1: number
- -: minus
- \Omega\_R: recursive density fraction
- ): close parenthesis
- -: minus
- \alpha\_R: minimal exchange strength
- C: coherence memory
- \right: right grouping marker
- ]: close bracket

### Equation 66

$$C' = -\gamma_C C + \eta \Omega_R (1 - C),$$

### Plain-word jigsaw, in equation order:

- C': e-fold derivative of coherence memory
- =: equals
- -: minus
- \gamma\_C: coherence decay per e-fold
- C: coherence memory
- +: plus
- \eta: coherence source strength
- \Omega\_R: recursive density fraction
- (: open parenthesis
- 1: number
- -: minus
- C: coherence memory
- ): close parenthesis

## Equation 67

$$\frac{H'}{H} = -\frac{3}{2} [1 + w(1 - \Omega_R) + w_R \Omega_R].$$

### Plain-word jigsaw, in equation order:

- `\frac`: fraction: numerator over denominator
- `H'`: e-fold derivative of Hubble rate
- `H`: Hubble rate
- `=`: equals
- `-`: minus
- `\frac`: fraction: numerator over denominator
- `3`: number
- `2`: number
- `\left`: left grouping marker
- `[`: open bracket
- `1`: number
- `+`: plus
- `w`: ordinary equation-of-state parameter
- `(`: open parenthesis
- `1`: number
- `-`: minus
- `\Omega_R`: recursive density fraction
- `)`: close parenthesis
- `+`: plus
- `w_R`: recursive equation-of-state parameter
- `\Omega_R`: recursive density fraction
- `\right`: right grouping marker
- `]`: close bracket

## Equation 68

$$\Omega_R(N), \quad C(N), \quad C\Omega_R, \quad \alpha_R C, \quad w_{\text{eff}}(N), \quad \frac{H(N)}{H_{\text{standard}}(N)}.$$

### Plain-word jigsaw, in equation order:

- $\Omega_R$ : recursive density fraction
- (: open parenthesis
- $N$ : e-fold time
- ): close parenthesis
- $C$ : coherence memory
- (: open parenthesis
- $N$ : e-fold time
- ): close parenthesis
- $C$ : coherence memory
- $\Omega_R$ : recursive density fraction
- $\alpha_R$ : minimal exchange strength
- $C$ : coherence memory
- $w_{\text{eff}}$ : effective equation of state
- (: open parenthesis
- $N$ : e-fold time
- ): close parenthesis
- $\frac{\text{numerator}}{\text{denominator}}$ : fraction: numerator over denominator
- $H$ : Hubble rate
- (: open parenthesis
- $N$ : e-fold time
- ): close parenthesis
- $H_{\text{standard}}$ : standard comparison Hubble rate
- (: open parenthesis
- $N$ : e-fold time
- ): close parenthesis

### Equation 69

$$\mathcal{M}(N), \quad \ln \frac{\mathcal{M}(N)}{\mathcal{M}(N_i)}.$$

#### Plain-word jigsaw, in equation order:

- `\mathcal{M}`: toy maturation index
- `(`: open parenthesis
- `N`: e-fold time
- `)`: close parenthesis
- `\ln`: natural logarithm
- `\frac`: fraction: numerator over denominator
- `\mathcal{M}`: toy maturation index
- `(`: open parenthesis
- `N`: e-fold time
- `)`: close parenthesis
- `\mathcal{M}`: toy maturation index
- `(`: open parenthesis
- `N_i`: initial e-fold
- `)`: close parenthesis

### Equation 70

$$\alpha_R \in [10^{-3}, 10], \quad \gamma_C \in [10^{-3}, 10], \quad \eta \in [10^{-3}, 10],$$

#### Plain-word jigsaw, in equation order:

- `\alpha_R`: minimal exchange strength
- `\in`: is in
- `[`: open bracket
- `10`: number
- `^{-3}`: raised index or power
- `10`: number
- `]`: close bracket
- `\gamma_C`: coherence decay per e-fold
- `\in`: is in

- [: open bracket
- 10: number
- $\sim^{-3}$ : raised index or power
- 10: number
- ]: close bracket
- $\eta$ : coherence source strength
- $\text{in}$ : is in
- [: open bracket
- 10: number
- $\sim^{-3}$ : raised index or power
- 10: number
- ]: close bracket

### Equation 71

$$\Omega_R = \frac{\rho_R}{\rho + \rho_R} = \frac{\rho_R}{\rho_{\text{tot}}}.$$

### Plain-word jigsaw, in equation order:

- $\Omega_R$ : recursive density fraction
- =: equals
- $\frac{\rho_R}{\rho + \rho_R}$ : fraction: numerator over denominator
- $\rho_R$ : recursive density
- $\rho$ : ordinary density
- +: plus
- $\rho_R$ : recursive density
- =: equals
- $\frac{\rho_R}{\rho + \rho_R}$ : fraction: numerator over denominator
- $\rho_R$ : recursive density
- $\rho_{\text{tot}}$ : total density

## Equation 72

$$\frac{\Omega'_R}{\Omega_R} = \frac{\rho'_R}{\rho_R} - \frac{\rho'_{\text{tot}}}{\rho_{\text{tot}}}.$$

### Plain-word jigsaw, in equation order:

- `\frac`: fraction: numerator over denominator
- `\Omega_R'`: e-fold derivative of recursive density fraction
- `\Omega_R`: recursive density fraction
- `=`: equals
- `\frac`: fraction: numerator over denominator
- `\rho_R'`: e-fold derivative of recursive density
- `\rho_R`: recursive density
- `-`: minus
- `\frac`: fraction: numerator over denominator
- `\rho_{\text{tot}}'`: e-fold derivative of total density
- `\rho_{\text{tot}}`: total density

## Equation 73

$$\frac{\rho'_R}{\rho_R} = -3(1 + w_R) - \alpha_R C.$$

### Plain-word jigsaw, in equation order:

- `\frac`: fraction: numerator over denominator
- `\rho_R'`: e-fold derivative of recursive density
- `\rho_R`: recursive density
- `=`: equals
- `-`: minus
- `3`: number
- `(`: open parenthesis
- `1`: number
- `+`: plus
- `w_R`: recursive equation-of-state parameter
- `)`: close parenthesis
- `-`: minus
- `\alpha_R`: minimal exchange strength
- `C`: coherence memory

### Equation 74

$$\rho'_{\text{tot}} = -3(1 + w)\rho - 3(1 + w_R)\rho_R.$$

#### Plain-word jigsaw, in equation order:

- $\rho_{\text{tot}}$ : e-fold derivative of total density
- =: equals
- -: minus
- 3: number
- (: open parenthesis
- 1: number
- +: plus
- w: ordinary equation-of-state parameter
- ): close parenthesis
- $\rho$ : ordinary density
- -: minus
- 3: number
- (: open parenthesis
- 1: number
- +: plus
- $w_R$ : recursive equation-of-state parameter
- ): close parenthesis
- $\rho_R$ : recursive density

### Equation 75

$$\rho = (1 - \Omega_R)\rho_{\text{tot}}, \quad \rho_R = \Omega_R\rho_{\text{tot}},$$

#### Plain-word jigsaw, in equation order:

- $\rho$ : ordinary density
- =: equals
- (: open parenthesis
- 1: number
- -: minus

- `\Omega_R`: recursive density fraction
- `)`: close parenthesis
- `\rho_{\rm tot}`: total density
- `\rho_R`: recursive density
- `=`: equals
- `\Omega_R`: recursive density fraction
- `\rho_{\rm tot}`: total density

### Equation 76

$$\frac{\rho'_{\text{tot}}}{\rho_{\text{tot}}} = -3[(1+w)(1-\Omega_R) + (1+w_R)\Omega_R].$$

### Plain-word jigsaw, in equation order:

- `\frac`: fraction: numerator over denominator
- `\rho_{\rm tot}'`: e-fold derivative of total density
- `\rho_{\rm tot}`: total density
- `=`: equals
- `-`: minus
- `3`: number
- `\left`: left grouping marker
- `[`: open bracket
- `(`: open parenthesis
- `1`: number
- `+`: plus
- `w`: ordinary equation-of-state parameter
- `)`: close parenthesis
- `(`: open parenthesis
- `1`: number
- `-`: minus
- `\Omega_R`: recursive density fraction
- `)`: close parenthesis
- `+`: plus

- (: open parenthesis
- 1: number
- +: plus
- w\_R: recursive equation-of-state parameter
- ): close parenthesis
- \Omega\_R: recursive density fraction
- \right: right grouping marker
- ]: close bracket

### Equation 77

$$\frac{\Omega'_R}{\Omega_R} = -3(1 + w_R) - \alpha_R C + 3[(1 + w)(1 - \Omega_R) + (1 + w_R)\Omega_R]$$

### Plain-word jigsaw, in equation order:

- \frac: fraction: numerator over denominator
- \Omega\_R': e-fold derivative of recursive density fraction
- \Omega\_R: recursive density fraction
- =: equals
- -: minus
- 3: number
- (: open parenthesis
- 1: number
- +: plus
- w\_R: recursive equation-of-state parameter
- ): close parenthesis
- -: minus
- \alpha\_R: minimal exchange strength
- C: coherence memory
- +: plus
- 3: number
- \left: left grouping marker
- [: open bracket

- (: open parenthesis
- 1: number
- +: plus
- w: ordinary equation-of-state parameter
- ): close parenthesis
- (: open parenthesis
- 1: number
- -: minus
- \Omega\_R: recursive density fraction
- ): close parenthesis
- +: plus
- (: open parenthesis
- 1: number
- +: plus
- w\_R: recursive equation-of-state parameter
- ): close parenthesis
- \Omega\_R: recursive density fraction
- \right: right grouping marker
- ]: close bracket

### Equation 78

$$= 3(w - w_R)(1 - \Omega_R) - \alpha_R C.$$

### Plain-word jigsaw, in equation order:

- =: equals
- 3: number
- (: open parenthesis
- w: ordinary equation-of-state parameter
- -: minus
- w\_R: recursive equation-of-state parameter
- ): close parenthesis

- (: open parenthesis
- 1: number
- -: minus
- \Omega\_R: recursive density fraction
- ): close parenthesis
- -: minus
- \alpha\_R: minimal exchange strength
- C: coherence memory

### Equation 79

$$\Omega'_R = \Omega_R [3(w - w_R)(1 - \Omega_R) - \alpha_R C].$$

### Plain-word jigsaw, in equation order:

- \Omega\_R': e-fold derivative of recursive density fraction
- =: equals
- \Omega\_R: recursive density fraction
- \left: left grouping marker
- [: open bracket
- 3: number
- (: open parenthesis
- w: ordinary equation-of-state parameter
- -: minus
- w\_R: recursive equation-of-state parameter
- ): close parenthesis
- (: open parenthesis
- 1: number
- -: minus
- \Omega\_R: recursive density fraction
- ): close parenthesis
- -: minus
- \alpha\_R: minimal exchange strength

- C: coherence memory
- \right: right grouping marker
- ]: close bracket

### Equation 80

$$H^2 = \frac{8\pi G}{3} \rho_{\text{tot}}.$$

#### Plain-word jigsaw, in equation order:

- H: Hubble rate
- ^2: squared
- =: equals
- \frac: fraction: numerator over denominator
- 8: number
- \pi: circle constant pi
- G: Newton gravitational constant
- 3: number
- \rho\_{\text{tot}}: total density

### Equation 81

$$2 \frac{H'}{H} = \frac{\rho'_{\text{tot}}}{\rho_{\text{tot}}}.$$

#### Plain-word jigsaw, in equation order:

- 2: number
- \frac: fraction: numerator over denominator
- H': e-fold derivative of Hubble rate
- H: Hubble rate
- =: equals
- \frac: fraction: numerator over denominator
- \rho\_{\text{tot}}': e-fold derivative of total density
- \rho\_{\text{tot}}: total density

## Equation 82

$$\frac{\rho'_{\text{tot}}}{\rho_{\text{tot}}} = -3(1 + w_{\text{eff}}),$$

### Plain-word jigsaw, in equation order:

- `\frac`: fraction: numerator over denominator
- `\rho_{\text{tot}}`' : e-fold derivative of total density
- `\rho_{\text{tot}}`: total density
- `=`: equals
- `-`: minus
- `3`: number
- `(`: open parenthesis
- `1`: number
- `+`: plus
- `w_{\text{eff}}`: effective equation of state
- `)`: close parenthesis

## Equation 83

$$w_{\text{eff}} = w(1 - \Omega_R) + w_R \Omega_R,$$

### Plain-word jigsaw, in equation order:

- `w_{\text{eff}}`: effective equation of state
- `=`: equals
- `w`: ordinary equation-of-state parameter
- `(`: open parenthesis
- `1`: number
- `-`: minus
- `\Omega_R`: recursive density fraction
- `)`: close parenthesis
- `+`: plus
- `w_R`: recursive equation-of-state parameter
- `\Omega_R`: recursive density fraction

## Equation 84

$$\frac{H'}{H} = -\frac{3}{2} [1 + w(1 - \Omega_R) + w_R \Omega_R].$$

### Plain-word jigsaw, in equation order:

- `\frac`: fraction: numerator over denominator
- `H'`: e-fold derivative of Hubble rate
- `H`: Hubble rate
- `=`: equals
- `-`: minus
- `\frac`: fraction: numerator over denominator
- `3`: number
- `2`: number
- `\left`: left grouping marker
- `[`: open bracket
- `1`: number
- `+`: plus
- `w`: ordinary equation-of-state parameter
- `(`: open parenthesis
- `1`: number
- `-`: minus
- `\Omega_R`: recursive density fraction
- `)`: close parenthesis
- `+`: plus
- `w_R`: recursive equation-of-state parameter
- `\Omega_R`: recursive density fraction
- `\right`: right grouping marker
- `]`: close bracket

### Equation 85

$$\Xi = \alpha_R C H \rho_R$$

#### Plain-word jigsaw, in equation order:

- $\Xi$ : exchange scalar
- =: equals
- $\alpha_R$ : minimal exchange strength
- C: coherence memory
- H: Hubble rate
- $\rho_R$ : recursive density

### Equation 86

$$[\Xi] = [H][\rho_R],$$

#### Plain-word jigsaw, in equation order:

- [: open bracket
- $\Xi$ : exchange scalar
- ]: close bracket
- =: equals
- [: open bracket
- H: Hubble rate
- ]: close bracket
- [: open bracket
- $\rho_R$ : recursive density
- ]: close bracket