Trajnostni razvoj:

od formalnih zavez k vplivnim dejanjem

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Sustainability

Trajnost

Trajnostni razvoj – Model 1

Storitve ekosistemov:

- čista voda in zrak
- proizvodnja hrane
- surovine in energija
- stabilno podnebje
- blaženje poplav
- duhovne vrednote

33-57 bilijonov $

(5.000 - 8.000 $ na prebivalca)

Trajnostni razvoj – Model 2

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$$t * \sin t = \int_0^t \tau \cdot \sin(t-\tau) * \tau = \left| \begin{matrix} u = \tau & dV = \sin(t-\tau) \\ du = 1 & V = \frac{\cos(t-\tau)}{t} \end{matrix} \right| = \tau \cdot \cos(t-\tau)\Big|_0^t - \int_0^t \cos(t-\tau)\, d\tau = 1 + \sin(t-\tau)\Big|_0^t = t - \sin t$$

$$t * \cos t = \int_0^t t \cdot \cos(t-\tau) = \tau \sin(t-\tau)\Big|_0^t + \int_0^t \sin(t-\tau)\, d\tau = 0 + \cos(t-\tau)\Big|_0^t = t \cdot \cos t$$

$$e^{\alpha t} * e^{\beta t} = \int_0^t e^{\alpha \tau} e^{\beta(t-\tau)}\, d\tau = \int_0^t e^{\alpha\tau + \beta t + \beta\tau}\, d\tau = \frac{e^{\alpha\tau + \beta t + \beta\tau}}{\alpha + \cancel{\beta} + \cancel{\beta}}\Big|_0^t = \frac{e^{\alpha t - \cancel{\beta t} + \cancel{\beta t}}}{\alpha t} - \frac{e^{\beta t}}{\beta t}$$

$$t * e^{\alpha t} = \int_0^t \tau \cdot e^{\alpha(t-\tau)}\, d\tau = -\frac{e^{\alpha(t-0)}}{\alpha(t-\tau)} + \int_0^t \frac{e^{\alpha(t-\tau)}}{t-\tau}$$

$$f(t) \doteqdot F(p),\ f(t);\ g(t) \doteqdot G(p) \Rightarrow pF(p)G(p) \doteqdot pF(p)G(p) = p[F(p) - f(+0) + f(+0)]$$

$$G(p) = p[F(p) - f(+0) + f(+0)]\, G(p) = [pF(p) - f(+0)] * G(p) + f(+0)G(p) \doteqdot f'(p) * g(t) + f(+0)\, g(t) = f(+0)\, g(t) = f(+0)\, g(t) \oplus$$

$$f(+0)\, g(t) + \int_0^t f'(t-\tau)\, g(t)\, d\tau.$$

$$F(p) = \sum_{n=-\infty}^{\infty} C_n (p-a)^n, \quad C_n = \frac{1}{2\pi i} \int_\gamma F(p)\, dp. \quad F(p) = \frac{C_{-m}}{(p-a)^m} + \frac{C_{-m+1}}{(p-a)^{m+1}} + \dots + \frac{C_{-2}}{(p-a)^2} + \frac{C_{-1}}{(p-a)} + C_0 + C_1(p-a) + C_2(p-a)^2 + \dots$$

$$(p-a)^m F(p) = C_{-m} + C_{-m+1}(p-a) + C_{-m+2}(p-a)^2 + \dots + C_{-2}(p-a)^{m-2} + C_{-1}(p-a)^{m-1} + C_0(p-a)^m + C_1(p-a)^{m-1} + \dots$$

$$C_{-m} = \lim_{p \to \alpha} (p-a)^m F(p)$$

$$\frac{d(p-a)^m F(p)}{dp} = C_{-m+1} + 2C_{-m+2}(p-a) + 3C_{-m+3}(p-a)^2 + \dots + (m-2)C_{-2}(p-a)^{m-3} + (m-1)C_{-1}(p-a)^{m-2} + m C_0 (p-a)^{m-1} + \dots$$

$$C_{-m+1} = \lim \frac{d(F(p)(p-a)^m)}{dp}; \quad C_{-m+2} = \frac{1}{2} \lim_{p \to \alpha} \frac{d^2[F(p)(p-a)^m]}{dp^2}$$

$$C_{-m+3} = \frac{1}{3!} \lim_{p \to \alpha} \frac{d^2[F(p)(p-\alpha)^m]}{dp^3}; \quad C_k = \frac{1}{(k+m)!} \lim \frac{d^{k+m}[F(p)(p-\alpha)^m]}{dp^{k+m}}$$

$$C_{-1} = \frac{1}{(m-1)!} \cdot \lim_{p \to \alpha} \frac{d^{m-1}[F(p)(p-\alpha)^m]}{dp^{m-1}}; \quad \int F(p)\, dp = 2\pi i \sum_{k=1}^{n} \operatorname{Res}[F(p)\, p_k]$$

raba vira, ekosistema

$\leq$

sposobnost obnavljanja

Tragedija skupnega pašnika

Rešitve?

Škode poplav v Sloveniji:

2007, 200 mio EUR

2010, 88 mio EUR

2012, 373 mio EUR (1,5 % BDP)

5 značilnosti ekosistemov

1. Energija sonca

2. Kroženje snovi

3. Strupi so biološko razgradljivi

4. Sodelovanje in tekmovanje

5. Mrežna povezanost

"Trajnostni razvoj pomeni,
da namesto omejenih naravnih dobrin
izkoriščamo neomejene zmogljivosti
našega (raz)uma."

Juha Sipila