The complexity game

Introduce the *Φ-game*, $\gamma(\Phi)$, with X and Y as *strategy sets* with [X] (*nature*) as maximizer and [Y] (*man*) as minimizer. This leads immediately to the *abstract MaxEnt principle* since, for each x, $\min_y \Phi(x,y) = H(x)$, hence $\max_x \min_y \Phi(x,y) = H_{max}(X)$, the *maximum entropy value*. Consider also *minimum risk* $R_{min} = \inf_y R(y)$ with $R(y) = \sup_x \Phi(x,y)$.

*Assume [diag, con, top, dom] and $H_{max} < \infty$. Then game is in **equilibrium** [Y] has an optimal strategy of the form $y^* = \widehat{x^*}$, x^* is **attractor** and strong inequalities hold for $x \in X, y \in Y$:*

$$H(x) + D(x, y^*) \le H_{max}$$
$$R_{min} + D(x^*, y) \le R(y) .$$

x^* *attractor*: For every sequence $(x_n) \subseteq X$ such that $H(x_n) \to H_{max}$ it holds that $x_n \to x*$.