# Matrimony - the system

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**Matrimony** a simple mathematical object consisting of a **health matrix** and a **species matrix**. These are grouped together in an ordered pair, but in general this is an implementation detail.

**Health matrix** a $3 \times 3$ matrix consisting of real numbers (or integers). This object directly controls the health of the matrimony in general, and describes "states" it can be in a consise form.

**Species matrix** a $2 \times 2$ matrix that consists strictly of real numbers. Its determinant represents its "evolution level", whereas its "orientation" (normalised value) would represent the "species". The determinant of this matrix can affect the health of the matrimony indirectly.

**Move** another mathematical object that consists of two vectors. The vectors have no real meaning separately, but similar moves may have a common vector part.

**Diagonstic** a single $3 \times 3$ vector that can compute a single number that represents, e.g. a matrimony's health, via something like Equation 1, where $D$ is the diagnostic vector and $d$ is the desired quantity.

$$d = \left|A^H D\right|^2 \tag{1}$$

A battle between two matrimonies $(A^H, A^S)$ and $(B^H, B^S)$, respectively emitting a move $(M^H, M^V)$ and $(N^H, N^V)$, would likely have their health matrices altered as such:

$$A^H \mapsto A^H N^V N^H \tag{2}$$
$$B^H \mapsto B^H M^V M^H \tag{3}$$

The species vector cannot generally be altered but they can restrict move vectors that a matrimony can have in some way. "Evolution" is handled in the following manner:

$$A^S \mapsto \left(\frac{1}{|A^S|} A^S\right)^2 \left(\left|A^S\right| + \delta x\right) \tag{4}$$

where $\delta x$ is some evolution factor.