

**CAP6938**

Neuroevolution and  
Artificial Embryogeny

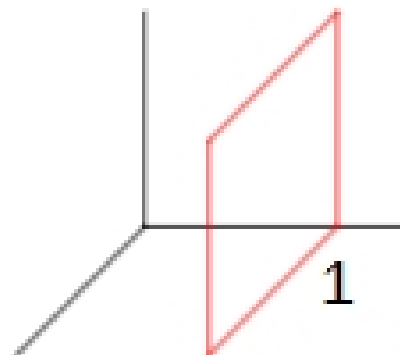
**Evolutionary Computation  
Theory**

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# Schema Theory (Holland 1975)

- A *building block* is a set of genes with good values
- Schemas are a formalization of buildings blocks
- Schemas are bit strings with \*'s (wildcards)
- $1^{***}0$  is all 6-bit strings surrounded by 1 and 0
- Order 2: 2 defined bits
- A schema defines a hyperplane
- Example:  $1^{**}$



# Schema Fitness

- GA implicitly evaluates fitness for all its schemas
- Average fitness of a schema is average fitness of all possible instances of it
- A GA behaves as if it were really storing these averages