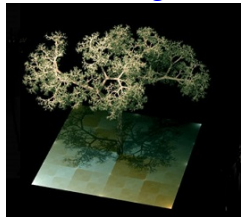


[Home](#) \* [Engines](#) \* **Tempo (engine)**



[Fractal Tree](#) using [L-system](#) <sup>[3]</sup>

### Tempo,

an experimental chess engine developed by [Mathieu Autonès](#), [Aryel Beck](#), [Phillippe Camacho](#), [Nicolas Lassabe](#), [Hervé Luga](#), and [François Scharffe](#), using an [artificial neuronal network](#) as [evaluation function](#) generated by a [genetic algorithm](#). Tempo applies [L-systems](#) as elaborated by [Egbert Boers](#) and [Herman Kuiper](#) <sup>[1]</sup>, to generate [modular neural networks](#) whose size is independent of that of the [chromosome](#) and [crossover](#) tolerant. A population of L-system construction rules is generated to mark the resulting networks according to their capabilities to [learn](#) game position evaluations from real games. Simple aspects were learnt at first. Strongest individuals learnt more complex faetures, from [material](#) to [square control](#) and [pawn structure](#) <sup>[2]</sup>.

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## Publications

- [Mathieu Autonès, Aryel Beck, Philippe Camacho, Nicolas Lassabe, Hervé Luga, François Scharffe \(2004\). Evaluation of Chess Position by Modular Neural network Generated by Genetic Algorithm. EuroGP 2004](#)

## Abstract

In this article we present our chess engine Tempo. One of the major difficulties for this type of program lies in the function for evaluating game positions. This function is composed of a large number of parameters which have to be determined and then adjusted. We propose an alternative which consists in replacing this function by an artificial neuron network (ANN). Without topological knowledge of this complex network, we use the evolutionist methods for its inception, thus enabling us to obtain, among other things, a modular network. Finally, we present our results:

- Reproduction of the [XOR function](#) which [validates](#) the method used
- Generation of an evaluation function

## Forum Posts

- [Presentation for a neural net learning chess program](#) by [Dann Corbit](#), [CCC](#), April 06, 2004

## External Links

- [Tempo from Wikipedia](#)
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- [Tempo \(app\) from Wikipedia](#)
- [Yamandu Costa - Tempo Feliz \(Baden Powell\)](#), [Tokyo Session](#) (2006), [YouTube](#) Video

## References

1. ^ [Egbert Boers](#), [Herman Kuiper](#) (1992). *Biological metaphors and the design of modular artificial neural networks*. Master's thesis, [Leiden University](#), [pdf](#)
2. ^ [Mathieu Autonès](#), [Aryel Beck](#), [Phillippe Camacho](#), [Nicolas Lassabe](#), [Hervé Luga](#), [François Scharffe](#) (2004). [Evaluation of Chess Position by Modular Neural network Generated by Genetic Algorithm](#). [EuroGP 2004](#)
3. ^ cropped from [Fractal trees](#) by [Solkoll](#). The images of the trees was generated from using a [L-system](#). The [fractal](#) used is a varied [dragon curve](#), [Wikimedia Commons](#), [L-system from Wikipedia](#)

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