

GPLAB
A Genetic Programming Toolbox for MATLAB

Sara Silva
ITQB/UNL

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(pages 33, 35, 47)
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Table 4.1: Location of state variables in this manual

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4.4 Population fitness

`popfitness, popnormfitness, popexpected, popranking, keepevals, varsvals`

Although each individual in `pop` stores its own fitness value, the state variable `popfitness` also stores a list of the fitness values of all individuals. Depending on the sampling procedure used (see Sect. 3.5), the normalized fitness, expected number of children, and ranking may also need to be calculated. These are stored in the state variables `popnormfitness`, `popexpected`, and `popranking`.

Evaluating an individual for its fitness may be a time consuming task, so previous evaluations may be stored in memory in case they are needed again (see Sect. 3.7), in the state variable `keepevals`, with the following fields:

- `inds` - the string of the individual.
- `fits` - the fitness of the individual.
- `ress` - the result of the evaluation in each fitness case.
- `used` - how many times this evaluation has been used.

The memory used by this variable is cleared when the run ends.

Because a great part of the time consumed in the evaluation of individuals consists on the assignment of the fitness cases to the variables (particularly when in presence of several inputs), a string containing all the inputs, ready for assignment, is also kept as the `varsvals` state variable. This string is constructed every time the fitness cases change (*i.e.*, only once in the beginning of the evolutionary process, in this version of the toolbox).

- [11] Silva, S., Almeida, J.: Dynamic maximum tree depth - a simple technique for avoiding bloat in tree-based GP. In E. Cantú-Paz, Foster, J.A., Deb, K., Davis, L.D., Roy, R., O'Reilly, U.-M., Beyer, H.-G., Standish, R., Kendall, G., Wilson, S., Harman, M., Wegener, J., Dasgupta, D., Potter, M.A., Schultz, A.C., Dowsland, K.A., Jonoska, N., Miller, J., editors, Proceedings of GECCO-2003, Berlin. Springer Verlag (2003) 1776–1787