

1. In the simple analytical model of PSO (Appendix B.4), in which no random numbers are used (and where there is no velocity restriction), the swarm remains bounded if and only if  $c_1 + c_2 < 4$ . TRUE  FALSE

2. How is the trade-off between exploration and exploitation handled in PSO?

3. In variable truncation PSO, all variables are integers at all times. TRUE  FALSE

1. Yes, this is TRUE. However, once random numbers are included in the simple theoretical model, the swarm will not remain bounded even if  $c_1 + c_2 < 4$ . In a real (applied) PSO, the swarm does remain bounded, however, due to the velocity restrictions (that, again, are not included in the simple theoretical model, but always in applications!)

2. It is handled using the inertia weight. For large values ( $>1$ ) of  $w$ , exploration is favored. For values of  $w$  smaller than 1, exploitation is favored instead.

3. No, this is FALSE. In variable truncation PSO, the rounded values are only used (temporarily) when computing the value of the objective function. At all other times, non-rounded values are used, both for the positions and the velocities. See also the slides from the lecture.