

# INF3490 exercises - week 5 2013

## Problem 1

The particle swarm velocity update formula is

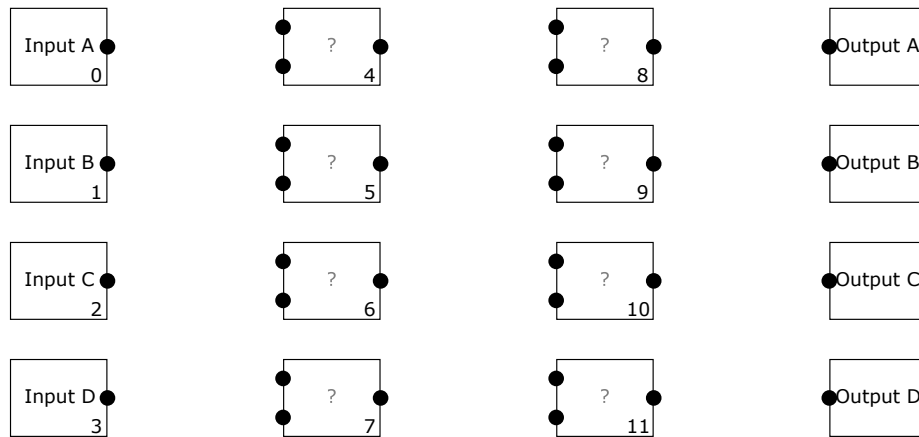
$$v_i^{(t+1)} \leftarrow \alpha v_i^{(t)} + U(0, \beta) (p_i - x_i^{(t)}) + U(0, \beta) (p_g - x_i^{(t)})$$

If we replaced the random terms related to personal and global best with a term proportional to the local objective function gradient, like this:

$$v_i^{(t+1)} \leftarrow \alpha v_i^{(t)} + \gamma \nabla f(x_i^{(t)})$$

How would the particles behave? How does this compare to gradient ascent?

## Problem 2



Construct circuits from the Cartesian genetic programming genotypes below, using the setup above:

- 231 110 323 121 165 046 154 176 11 5 8 9
- 003 332 123 010 167 075 345 365 9 10 11 4