

**Input:** Block  $blk$

**Output:** Return the widen bounds  $blk.d_{widen}$  in block  $blk$

1: **Variables**

2:    $blk.d_{in}(var)$  is domain  $d(var)$  before a loop iteration of bound inference;

3:    $blk.d(var)$  is domain  $d(var)$  after the loop iteration of bound inference;

4:    $ub\_c(var)$  is the counter of upper bound for domain  $d(var)$ ;

5:    $lb\_c(var)$  is the counter of lower bound for domain  $d(var)$ .

6: **end Variables**

  // Check bound changes and widen the bounds with threshold

7: **procedure** NAIVE\_WIDEN\_BOUND( $blk$ )

8:   **for each**  $var$  in  $blk$  **do**

9:     // Widen upper bound every subsequent three iterations

10:    **if**  $upper(blk.d(var)) > upper(blk.d_{in}(var))$  **then**

11:     // The upper bound increases in this iteration

12:      $ub\_c(var)++$

13:     **if**  $ub\_c(var) == 3$  **then**

14:       // Widen the upper bound of  $d(var)$  in block  $blk$  to  $\infty$

15:        $blk.d(var).upper := +\infty$

16:        $ub\_c(var) := 0$  // Reset upper bound's counter

17:     **end if**

18:    **else**

19:      $ub\_c(var) := 0$  // Reset upper bound's counter

20:    **end if**

21:    // Widen lower bound every subsequent three iterations

22:    **if**  $lower((blk.d(var)) < lower(blk.d_{in}(var))$  **then**

23:     // The lower bound decreases in this iteration

24:      $lb\_c(var)++$

25:     **if**  $lb\_c(var) == 3$  **then**

26:       // Widen lower bound of  $d(var)$  in block  $blk$  to  $-\infty$

27:        $blk.d(var).lower := -\infty$

28:        $lb\_c(var) := 0$  // Reset lower bound's counter

29:     **end if**

30:    **else**

31:      $lb\_c(var) := 0$  // Reset lower bound's counter

32:    **end if**

33: **end for**

34: **return**  $blk.d$  // Return the widen domain set

35: **end procedure**