Low-Power Contest 16/17

Synthesis and Optimization of Digital Systems

Write a new TCL command integrated in Prime Time that performs a post-synthesis Dual-Vth cell assignment for leakage power optimization. Main arguments of the command are:

- `-lvt` → the maximum % of LVT cells allowed after the assignment process, defined in the range [0, 1]
- `-constraint [soft|hard]` → optimization effort; available options are:
  - `soft` (the lvt constraint can be exceeded to guarantee zero delay penalty, i.e., negative slack not allowed)
  - `hard` (the lvt constraint is a hard constraint and it must be satisfied even at the expense of a larger worst-case delay, i.e., negative slack allowed)

The following metrics will be used for evaluation:

1. compliance with timing/%LVT constraints
2. % of leakage reduction w.r.t. the initial configuration
3. execution time, i.e. difference between starting-time and end-time (using the tcl **clock** command)

SYNOPSIS

```
dualVth –lvt $percentage$ -constraint $effort$
```

Basic Rules for the Competition

1. Combinational circuits used as benchmarks: {`c1908.v, c5315.v}`. Note: the proposed algorithm must be general and will be tested on other benchmarks, too.
2. The command will be executed under PrimeTime, just after the script `pt_analysis.tcl`
3. The benchmark is first synthesized under a fixed timing constraint (e.g., `clockPeriod` = 3.0 ns) using the `synthesis.tcl` script (single-VT library).
4. You must use the template available on the webpage of the couse. You can add your own procedures but they must be called inside the `dualVth` procedure.
5. Scores:
   - groups that deliver a working script (constraints satisfied) will get 3 points;
   - the algorithm getting the best savings with the minimum penalty (slack, when allowed, and CPU time) will get **3** extra points;
   - fake (and/or cut&paste) scripts will get **-3** points.

Each group will send a mail to **andrea.calimera@polito.it**, **valerio.tenace@polito.it** and **valentino.peluso@polito.it** in cc, using as subject <**SODS17 GroupN**> (with N the ID of the group). Attached with the mail the following 2 files:

1. one single TCL file, titled <**dualVth_Group_N.tcl**>, containing the script code
2. 1 (one) page pdf, titled <**Group_N.pdf**>, which gives a brief description of the algorithm

***** DEADLINE Jun 25 (hh 00:00) *****

(late messages, or messages not compliant with the above specs, will be automatically discarded)