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**The Modified Cost Function**  $WCET = \max \left( \sum_{i=1}^{N} \sum_{j=1}^{n_i} (cHIT_{i,j} \cdot xHIT_{i,j} + cMISS_{i,j} \cdot xMISS_{i,j}) \right)$ where  $CHIT_{i,j} - \text{execution time of L-block } B_{i,j} \text{ with cache hit } xHIT_{i,j} - \text{cache hit count of L-block } B_{i,j} \text{ with cache miss } xMISS_{i,j} - \text{execution time of L-block } B_{i,j} \text{ with cache miss } xMISS_{i,j} - \text{cache miss count of L-block } B_{i,j} \text{ with cache miss } xMISS_{i,j} - \text{cache miss count of L-block } B_{i,j} \text{ with cache miss } xMISS_{i,j} - \text{cache miss count of L-block } B_{i,j} \text{ with cache miss } xMISS_{i,j} - \text{cache miss count of L-block } B_{i,j} \text{ with cache miss } xMISS_{i,j} - \text{cache miss count of L-block } B_{i,j} \text{ with cache miss } xMISS_{i,j} = xHIT_{i,j} + xMISS_{i,j} \quad \{j = 1, 2, ..., n_i\}$ Subject to the structural/functionality constraints, discussed before, as well as additional cache constraints.











Advantage of the Approach			
LBer		130	
Program	Measured WCET	Estimated WCET with cache analysis	Estimated WCET without cache analysis
Check_data	$4.41 \times 10^{2}$	4.91 × 10 <sup>2</sup>	11.9 × 10 <sup>2</sup>
Piksrt	$1.79 \times 10^{3}$	1.82 × 10 <sup>3</sup> 1.5%	5.01 × 10 <sup>3</sup> <b>2.8 t</b> i
Line	$4.85 \times 10^{3}$	$6.09 \times 10^{3}$	9.15 × 10 <sup>3</sup>
Circle	$1.45 \times 10^{4}$	1.53 × 10 <sup>4</sup>	$1.59 \times 10^{4}$
FFT	2.05 × 10 <sup>6</sup>	2.71× 10 <sup>6</sup>	4.04 × 10 <sup>6</sup>
Des	2.42 × 10 <sup>5</sup>	3.66× 10 <sup>5</sup>	6.69 × 10 <sup>5</sup>
Fullsearch	$6.25 \times 10^{4}$	9.57× 10 <sup>4</sup>	$29.0 \times 10^4$
Whetstone	6.83 × 10 <sup>6</sup>	10.2× 10 <sup>6</sup>	$14.9 \times 10^{6}$
Dhry	5.52 × 10 <sup>5</sup>	7.53× 10 <sup>5</sup>	$13.3 \times 10^5$
Matgen	9.28 × 10 <sup>3</sup>	10.9× 10 <sup>3</sup>	$17.2 \times 10^{3}$
Prof. Z. Peng, ESL/	AB/LiTH, Sweden	28	









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