Global Floorplanning via Semidefinite Programming

I. GLOBAL FLOORPLANNING RESULTS

In this section, we only compare the performance of the global floor-planning in terms of two metrics, area score and wirelength. Larger area score represents more possible to satisfy the area constraint. To be specific, after the global floorplanning, center coordinates are calculated, and a voronoi diagram is constructed based on the center coordinates. Then, the area score s_a is calculated by the mean of the area ratio between the voronoi cell and the corresponding minimum area in the constraint, i.e., $s_a = \sum_{0 \leq i \leq n-1} \min(1, \frac{c_a}{\text{min area}})/n$. The result is shown in TABLE I. wirelength is computed using the calculated centers. Generally, our method is much better than AR and UFO in terms of wirelength. The wirelength is reduced by 19.1% and 45.4% compared with AR and UFO, respectively. As a trade-off, the area score is reduced by 0.06. In some case, our method even achieves lower wirelength with better area score. For example, in the case of ami33, the wirelength is reduced by 9.3%/44.9% (AR/UFO), at the same time, the area score improves from 0.9538/0.9481 to 0.9740. As analyzed in the previous section, larger benchmark leads to harder convergence and requires a larger α. The results with 10 times larger α are shown in the parentheses. With a larger $alpha$, which represents a more strict rank constraint, the average area score is improved by 0.02 compared with AR and UFO. Moreover, the average wirelength is reduced by 5.4% and 37.4%, respectively.

TABLE I Global floorplanning results compared with AR and UFO, the aspect ratio is 1:1.

	area score			wirelength		
	AR	UFO	Ours (with larger α)	AR	UFO	Ours (with larger α)
ami33	0.9538	0.9481	0.9740	85250	140285	77394
ami49	0.9453	0.9252	0.9071 (0.9721)	1033963	2073863	817402
n10	0.9774	1.0000	0.9584	58443	74076	50984
n30	0.9792	0.9551	0.9123 (0.9786)	164644	211053	159704 (170042)
n50	0.9555	0.9678	0.8861 (0.9811)	218310	257431	193062 (224962)
n100	0.9642	0.9518	0.9166 (0.9810)	381923	427621	320861 (368921)
n200	0.9543	0.9628	0.9288 (0.9823)	691234	732428	511838 (661247)
avg	0.9614	0.9587	0.8990 (0.9753)	376253	559537	304464 (356009)