



ISCSO 2013

The winner of ISCSO 2013, *LLBo Juniors* team, from Technical University of Munich

*LLBo Juniors* team members



Markus Schatz



Qian Xu

Markus Schatz born in Friedrichshafen (Baden-Württemberg in Germany) studied aerospace at the Technical University of Munich and made his diploma thesis at the space structures laboratory of the California Institute of Technology. Currently, he is studying at the Technical University of Munich as a PhD student. Qian Xu born in Wuhan (Hubei in China) studied aerospace at the Beijing Institute of Technology and made her Bachelor's and Master's thesis there. She is currently a PhD student at the Technical University of Munich. Her research topics are multidisciplinary design optimization and surrogate modeling techniques.

**The reported design by *LLBo Juniors* team**

Group Index	Design Variable Index	Group Size	Optimal Value
1	1,2,3,4,5,6,7,8,9,10,11,12	48	13
	13,14,15,16,17,18,19,20,21,22,23,24		
	26,28,30,32,34,36,38,40,42,44,46,48		
	50,52,54,56,58,60,62,64,66,68,70,72		
2	25,27,29,31,33,35,37,39,41,43,45,47	24	18
	49,51,53,55,57,59,61,63,65,67,69,71		
3	73,74,75,76,77,78,79,80,81,82,83,84	24	9
	85,86,87,88,89,90,91,92,93,94,95,96		
4	97,99,101,103,105,107,109,111,113,115,117,119	24	17
	121,123,125,127,129,131,133,135,137,139,141,143		
5	98,100,102,104,106,108,110,112,114,116,118,120	24	5
	122,124,126,128,130,132,134,136,138,140,142,144		
6	145,146,147,148,149,150,151,152,153,154,155,156	24	12
	157,158,159,160,161,162,163,164,165,166,167,168		
7	169,171,173,175,177,179,181,183,185,187,189,191	24	17
	193,195,197,199,201,203,205,207,209,211,213,215		
8	170,172,174,176,178,180,182,184,186,188,190,192	24	7
	194,196,198,200,202,204,206,208,210,212,214,216		
9	217,218,219,220,221,222,223,224,225,226,227,228	24	13
	229,230,231,232,233,234,235,236,237,238,239,240		
10	241,244,247,250,253,256,259,262,265,268,271,274	12	14
11	242,243,245,246,248,249,251,252,254,255,257,258	24	15
	260,261,263,264,266,267,269,270,272,273,275,276		
12	277,278,279,280,281,282,283,284,285,286,287,288	12	1
13	289,291,293,295,297,299,301,303,305,307,309,311	12	20
14	290,292,294,296,298,300,302,304,306,308,310,312	12	7
15	313,314,315,316,317,318,319,320,321,322,323,324	12	9
16	325,328,331,334,337,340	6	21
17	326,327,329,330,332,333,335,336,338,339,341,342	12	15
18	343,344,345,346,347,348	6	32
19	349,350,351,352,353,354	6	37
Objective function value: 14938.2		Number of evaluations: 853	

**Note:** The grouping approach used by *LLBo Juniors* has reduced the dimension of the design space from 354 to 19. The employed grouping is based on a deterministic and numeric approach which does not need any structural system information and uses only the objective function value to identify the groups.