

# Appendix

## 1 Data Source

To ensure the authority and reliability of the source of the dataset, in the process of selecting the competition, the dataset only contains the A-level international events recognized by ISU. Due to a major change in ISU's scoring rules for figure skating in 2018, the dataset only includes events from 2019 and beyond. For this dataset, 12 events from the 2018-2019 season to the 2021-2022 season are selected, and the specific tournament names are shown in Tab. 1.

**Table 1: Events and abbreviations.**

Number	Events	Abbr.
1	World Figure Skating Championships	Wc
2	European Figure Skating Championships	ec
3	Four Continents Figure Skating Championships	4cc
4	Winter Olympic Games	og
5	Grand Prix of Figure Skating Final	gpf
6	Skate America	sa
7	Skate Canada	sc
8	Internationaux de France	idf
9	Cup of China	coc
10	Rostelecom Cup	rc
11	NHK Trophy	nhk
12	World Team Trophy	wt

Competition index, name, number of participants and their corresponding download links are listed in Tab. 2.

**Table 2: Competition index, name, number of participants and their corresponding download links.**

Index	Competition Name	Number	Download Link
Short Program (sp)			
1	sp_wc_2019_men	35	<a href="https://www.youtube.com/watch?v=ofpqwkG2k_A">https://www.youtube.com/watch?v=ofpqwkG2k_A</a>
2	sp_wc_2019_women	39	<a href="https://www.youtube.com/watch?v=WKDXWfUW7W8">https://www.youtube.com/watch?v=WKDXWfUW7W8</a>

3	sp_wc_2021_men	33	<a href="https://www.youtube.com/watch?v=-LQPkdDCVs">https://www.youtube.com/watch?v=-LQPkdDCVs</a>
4	sp_wc_2021_women	35	<a href="https://www.youtube.com/watch?v=BAszAUnCx9w">https://www.youtube.com/watch?v=BAszAUnCx9w</a>
5	sp_wc_2022_men	29	/
6	sp_wc_2022_women	33	<a href="https://www.youtube.com/watch?v=jsfbhWjEIxQ">https://www.youtube.com/watch?v=jsfbhWjEIxQ</a>
7	sp_og_2022_men	28	/
8	sp_og_2022_women	30	/
9	sp_ec_2019_men	36	/
10	sp_ec_2019_women	18	<a href="https://www.bitchute.com/channel/BLLcSQcF5CX9">https://www.bitchute.com/channel/BLLcSQcF5CX9</a>
12	sp_ec_2020_women	36	<a href="https://www.youtube.com/watch?v=d221uu_fh54">https://www.youtube.com/watch?v=d221uu_fh54</a>
14	sp_ec_2022_women	36	<a href="https://www.youtube.com/watch?v=ZmUTtZvdfdk">https://www.youtube.com/watch?v=ZmUTtZvdfdk</a>
15	sp_4cc_2019_men	25	/
16	sp_4cc_2019_women	22	/
17	sp_4cc_2020_men	24	<a href="https://www.youtube.com/watch?v=ZiZufVta92I">https://www.youtube.com/watch?v=ZiZufVta92I</a>
18	sp_4cc_2020_women	19	<a href="https://www.youtube.com/watch?v=dbkYpCI5Jyk">https://www.youtube.com/watch?v=dbkYpCI5Jyk</a>
21	sp_4cc_2022_men	16	<a href="https://www.youtube.com/watch?v=0OUN9T4hWiE">https://www.youtube.com/watch?v=0OUN9T4hWiE</a>
23	sp_gpf_2019_men	6	<a href="https://www.youtube.com/watch?v=yCBPaR5OskQ">https://www.youtube.com/watch?v=yCBPaR5OskQ</a>
24	sp_gpf_2019_women	6	<a href="https://www.youtube.com/watch?v=VPQiN5ShoNg">https://www.youtube.com/watch?v=VPQiN5ShoNg</a>
25	sp_sa_2019_men	11	<a href="https://www.youtube.com/watch?v=eslqc_ZisUU">https://www.youtube.com/watch?v=eslqc_ZisUU</a>
26	sp_sa_2019_women	9	<a href="https://www.youtube.com/watch?v=PaJ3WMp5Hnw">https://www.youtube.com/watch?v=PaJ3WMp5Hnw</a>
27	sp_sa_2020_women	11	<a href="https://www.youtube.com/watch?v=_H_JX7zCcPQ">https://www.youtube.com/watch?v=_H_JX7zCcPQ</a>
28	sp_sc_2019_men	12	<a href="https://www.youtube.com/watch?v=S45PUakf848">https://www.youtube.com/watch?v=S45PUakf848</a>
29	sp_sc_2019_women	12	<a href="https://www.youtube.com/watch?v=qWujda_jckc">https://www.youtube.com/watch?v=qWujda_jckc</a>
30	sp_ifp_2019_men	10	<a href="https://www.youtube.com/watch?v=fIlVte2w4n8">https://www.youtube.com/watch?v=fIlVte2w4n8</a>
31	sp_ifp_2019_women	9	<a href="https://www.youtube.com/watch?v=6shmgVL_4Jg">https://www.youtube.com/watch?v=6shmgVL_4Jg</a>
32	sp_coc_2019_men	12	<a href="https://www.youtube.com/watch?v=gr0kUwIjY90">https://www.youtube.com/watch?v=gr0kUwIjY90</a>
33	sp_coc_2019_women	11	<a href="https://www.youtube.com/watch?v=3EOvAZ5XwbQ">https://www.youtube.com/watch?v=3EOvAZ5XwbQ</a>
34	sp_rc_2019_men	11	<a href="https://www.youtube.com/watch?v=IthiIWTExbQ">https://www.youtube.com/watch?v=IthiIWTExbQ</a>
35	sp_rc_2019_women	12	<a href="https://www.youtube.com/watch?v=xP6KnPCH5Oo">https://www.youtube.com/watch?v=xP6KnPCH5Oo</a>
36	sp_nhk_2019_men	12	<a href="https://www.youtube.com/watch?v=fEG6nIaADX4">https://www.youtube.com/watch?v=fEG6nIaADX4</a>
37	sp_nhk_2019_women	11	<a href="https://www.youtube.com/watch?v=oeauMj7Z_Vg">https://www.youtube.com/watch?v=oeauMj7Z_Vg</a>

38	sp_nhk_2020_men	9	<a href="https://www.youtube.com/watch?v=rHaCvw9Kvww">https://www.youtube.com/watch?v=rHaCvw9Kvww</a>
39	sp_wtt_2021_men	11	<a href="https://www.youtube.com/watch?v=-LQPkdDCVs">https://www.youtube.com/watch?v=-LQPkdDCVs</a>
40	sp_wtt_2021_women	12	<a href="https://www.youtube.com/watch?v=BAszAUnCx9w">https://www.youtube.com/watch?v=BAszAUnCx9w</a>
41	sp_gpf_2018_men	6	<a href="https://www.youtube.com/watch?v=AFfnluW2y5o">https://www.youtube.com/watch?v=AFfnluW2y5o</a>
42	sp_gpf_2018_women	6	<a href="https://www.youtube.com/watch?v=97r2o0j3P38">https://www.youtube.com/watch?v=97r2o0j3P38</a>
43	sp_sa_2020_men	12	<a href="https://www.youtube.com/watch?v=upUPlq_s1nE">https://www.youtube.com/watch?v=upUPlq_s1nE</a>
44	sp_rc_2020_men	12	<a href="https://www.youtube.com/watch?v=PkKAvZFJABg">https://www.youtube.com/watch?v=PkKAvZFJABg</a>
45	sp_nhk_2020_women	12	<a href="https://www.youtube.com/watch?v=tN0nFPPxdLQ">https://www.youtube.com/watch?v=tN0nFPPxdLQ</a>
<b>Free Skating (fs)</b>			
46	fs_gpf_2018_men	3	<a href="https://www.youtube.com/watch?v=DrXWp0txByY">https://www.youtube.com/watch?v=DrXWp0txByY</a>
47	fs_gpf_2018_women	6	<a href="https://www.youtube.com/watch?v=K25v-NZzw_k">https://www.youtube.com/watch?v=K25v-NZzw_k</a>
48	fs_wc_2019_men	24	<a href="https://www.youtube.com/watch?v=zJ42qYcKwbI">https://www.youtube.com/watch?v=zJ42qYcKwbI</a>
49	fs_wc_2019_women	24	<a href="https://www.youtube.com/watch?v=FiSLEHITENw">https://www.youtube.com/watch?v=FiSLEHITENw</a>
50	fs_sa_2019_men	11	<a href="https://www.youtube.com/watch?v=lnIBMLKI5cU">https://www.youtube.com/watch?v=lnIBMLKI5cU</a>
51	fs_sa_2019_women	10	<a href="https://www.youtube.com/watch?v=Z_QT2UkLbjA">https://www.youtube.com/watch?v=Z_QT2UkLbjA</a>
52	fs_sc_2019_women	12	<a href="https://www.youtube.com/watch?v=8gL4PcqODr4">https://www.youtube.com/watch?v=8gL4PcqODr4</a>
53	fs_ifp_2019_men	11	<a href="https://www.youtube.com/watch?v=GkJxIF9LVa8">https://www.youtube.com/watch?v=GkJxIF9LVa8</a>
54	fs_ifp_2019_women	11	<a href="https://www.youtube.com/watch?v=XEs_M_h6_Ko">https://www.youtube.com/watch?v=XEs_M_h6_Ko</a>
55	fs_coc_2019_men	12	<a href="https://www.youtube.com/watch?v=ab-U_ylL1kI">https://www.youtube.com/watch?v=ab-U_ylL1kI</a>
56	fs_coc_2019_women	12	<a href="https://www.youtube.com/watch?v=YiynTTf3tT8">https://www.youtube.com/watch?v=YiynTTf3tT8</a>
57	fs_rc_2019_men	11	<a href="https://www.youtube.com/watch?v=zb2P2YWtp-w">https://www.youtube.com/watch?v=zb2P2YWtp-w</a>
58	fs_rc_2019_women	12	<a href="https://www.youtube.com/watch?v=d95k_U0Ux9M">https://www.youtube.com/watch?v=d95k_U0Ux9M</a>
59	fs_nhk_2019_men	12	<a href="https://www.youtube.com/watch?v=YWXF57mc9-A">https://www.youtube.com/watch?v=YWXF57mc9-A</a>
60	fs_nhk_2019_women	12	<a href="https://www.youtube.com/watch?v=KXUXkjTOPoM">https://www.youtube.com/watch?v=KXUXkjTOPoM</a>
61	fs_gpf_2019_men	6	<a href="https://www.youtube.com/watch?v=ypdKCzNjkKY">https://www.youtube.com/watch?v=ypdKCzNjkKY</a>
62	fs_gpf_2019_women	6	<a href="https://www.youtube.com/watch?v=aI5Xg_AwRzQ">https://www.youtube.com/watch?v=aI5Xg_AwRzQ</a>
63	fs_ec_2020_men	23	<a href="https://www.youtube.com/watch?v=obe_WTRy_aU">https://www.youtube.com/watch?v=obe_WTRy_aU</a>
64	fs_ec_2020_women	24	<a href="https://www.youtube.com/watch?v=iqANPkXkygc">https://www.youtube.com/watch?v=iqANPkXkygc</a>
65	fs_4cc_2020_men	23	<a href="https://www.youtube.com/watch?v=80mowjyxIbk">https://www.youtube.com/watch?v=80mowjyxIbk</a>
66	fs_4cc_2020_women	20	<a href="https://www.youtube.com/watch?v=-nUKYq0HgCA">https://www.youtube.com/watch?v=-nUKYq0HgCA</a>

67	fs_sa_2020_men	12	<a href="https://www.youtube.com/watch?v=Np-2m5t-LDs">https://www.youtube.com/watch?v=Np-2m5t-LDs</a>
68	fs_sa_2020_women	12	<a href="https://www.youtube.com/watch?v=k9YLnz_CG4s">https://www.youtube.com/watch?v=k9YLnz_CG4s</a>
69	fs_rc_2020_men	11	<a href="https://www.youtube.com/watch?v=uzfVSuWsVa4">https://www.youtube.com/watch?v=uzfVSuWsVa4</a>
70	fs_rc_2020_women	10	<a href="https://www.youtube.com/watch?v=aP-ZD16MoGM">https://www.youtube.com/watch?v=aP-ZD16MoGM</a>
71	fs_nhk_2020_men	10	<a href="https://www.youtube.com/watch?v=yAg_w6TQwVg">https://www.youtube.com/watch?v=yAg_w6TQwVg</a>
72	fs_nhk_2020_women	12	<a href="https://www.youtube.com/watch?v=jzVi9QVyu8Q">https://www.youtube.com/watch?v=jzVi9QVyu8Q</a>
73	fs_wtt_2021_men	11	<a href="https://www.youtube.com/watch?v=xg3oFUgOeVY">https://www.youtube.com/watch?v=xg3oFUgOeVY</a>
74	fs_wtt_2021_women	12	<a href="https://www.youtube.com/watch?v=FpASRfh_2Iw">https://www.youtube.com/watch?v=FpASRfh_2Iw</a>
75	fs_ec_2022_men	24	<a href="https://www.youtube.com/watch?v=DZSruR33cG0">https://www.youtube.com/watch?v=DZSruR33cG0</a>
76	fs_ec_2022_women	23	<a href="https://www.youtube.com/watch?v=f7l2ENlj0PQ">https://www.youtube.com/watch?v=f7l2ENlj0PQ</a>
77	fs_4cc_2022_men	16	<a href="https://www.youtube.com/watch?v=JUblLq31AUrc">https://www.youtube.com/watch?v=JUblLq31AUrc</a>

## 2 Annotation

We annotate not only the total score (TOT), TES, PCS, factors, and deductions, which are always included in existing datasets, but also the Base Value (BV) and Grade of Execution (GOE) in TES, and Skating Skills, Transition, Performance, Choreography and Interpretation in PCS. Moreover, scores from 7-9 judges are also recorded. Tab. 3 entirely describes items in the annotation file for one sample.

**Table 3: Item description and example in the annotation file for one sample.**

Item			Description	Example
competition			Short name of the competition	"fs_gpf_2018_men"
competition_index			Competition number	46
total_segment_score			Total segment score (TOT)	189.43
total_element_score			Total element score (TES)	101.79
total_program_component_score(factored)			Total program component score (PCS)	88.64
factor			Factor (1.0 for men short program, 0.8 for women short program, 2.0 for men free skating, 1.6 for women free skating)	2.0
total_program_component_score_not_factored			Total program component score not factored	44.32
deductions			Deductions	-1.0
element_score			7 or 12 element score	[15.40,4.31,7.06,10.06,4.1 1,5.40,18.33,12.37,11.56,4. 29,4.35,4.55]
component_score_not_factored			5 component score not factored	[9.04,8.64,8.82,8.93,8.89]
executed_el	element1	element	Action name and difficulty	"3F+1Eu+3S"

element		coarse_class	Coarse category of the subaction	"jump"
		jump_comb	0 for single jump, 1 for 2 combination jump, 2 for 3 combination jump, 3 for 2 sequence jump, 4 for 3 sequence jump, -1 for spin and sequence	2
		bv	Base value	11.11
		judge_score	7-9 judge score	[2,0,0,1,-1,1,1,2]
		goe	Grade of execution	0.45
		score_of_panel	Score of panel (bv+goe)	11.56
		linfo	Special mark in jump action (if there is no, it is 0, and the spin and sequence are -1)	["x"]
		minfo		["x"]
		rinfo		["x"]
		time	Start and end time of the subaction	"0-25,0-29"
	.....	.....	.....	.....
	element7	.....	.....	.....
program_component	skating_skills	judge_score	7-9 judge score of skating skills	[9.25,8.75,8.75,9.00,8.50,9.00,9.25,9.50,9.25]
		score_of_panel	Score of panel of skating skills	9.04
	transitions	.....	Transitions	.....
	performance	.....	Performance	.....
	composition	.....	Composition	.....
	interpretation	.....	Interpretation	.....