

# THE INVESTIGATION OF THE COMPLEX COORDINATION AND THE RELIABILITY OF JUMPS PERFORMANCE IN THE SECOND PART OF FIGURE SKATERS' FREE PROGRAMMES

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## Abstract

The Problem: statistic analysis of the second part of figure skaters' free programmes.

The Object of the Research: figure skaters (men and women):

- Senior professional athletes taking part in The European Championships, in The World Championships and in The Olympic Games.
- Junior professional athletes taking part in different Junior ISU competitions.

The Subject of the Research: the 2<sup>nd</sup> part of free programmes among figure skaters of different sports qualification – Senior-professional athletes and Junior professional athletes.

The Aim of the Research is learning the difference of figure skaters' free programmes according to the new ISU Judging System paying attention to the second part of the programme, researching the dependence of the complex coordination and of the stability of jump elements in the 2<sup>nd</sup> part of free programmes on different factors.

The Hypothesis of the Research:

- The complex coordination and the reliability of jumps performance in the second part of free programmes among the figure skaters who have the same sports qualification directly depend on athletes' rating.
- The complex coordination and the reliability of jumps performance in the second part of figure skaters' free programmes directly depend on the sports qualification.
- The complex coordination and the reliability of jumps performance in the second part of free programmes for men are higher than for women.
- The complex coordination and the reliability of jumps performance in the 2<sup>nd</sup> part of free programmes improve during the season of competitions and during the Olympic cycle.

## Introduction

Under the new ISU Judging System technical marks are awarded individually for each skating element. Competitive programmes are constrained to have a set number of elements. Each element is judged first by a technical specialist who identifies the specific element. The technical specialist's decision determines the Base Value of the element. Then a panel of nine judges awards a mark for Grade of Execution (GOE) that is in an interval from -3 to +3. The GOE mark is then translated into a value according to the ISU table of values. The GOE marks from the nine judges are then averaged by selecting 7 judges discarding the highest and the lowest marks and averaging the remaining 7. The average value is then added (or subtracted) to the base value to get the final value of the element named «Scores of Panel».

## Description of the Studied Problem

So why are we so interested in the 2nd part of figure skaters' free programmes?

A free programme for singles is an interval type of activity with both, fast and slow skating, maximal jumps, twists, spins and spirals. From the physiological perspective the primary requirements are muscular strength, power and endurance with sufficient aerobic and anaerobic power to complete a free programme without excessive fatigue. Excellent flexibility is also an essential component.

So we can see that figure skating is a kind of sport which demands from athletes' physical conditions and from the conditions of the CNS to be at a very high level.

And the new ISU Judging System takes it into account. If figure skaters are able to perform jump elements of high coordination in the conditions of excessive fatigue they can include these elements into the 2nd part of their free programme, because the Base Value of these jumps is going to be higher than the Base Value performed in the 1st part of the programme. Jump elements performed after the halfway point of a free programme are marked with a sign x and their Base Values are multiplied by the credit 1.1.

During our research we analyze the main competitions in athletes' seasons in the last Olympic cycle. Table 1 reflects the analysis of the Men's Free Skating at the Olympics 2010.

*Tab. 1 The Analysis of Men's Free Skating at the Olympic Games 2010.*

Place In FS	The Competitor	Number of jumps In the 2 <sup>nd</sup> part of FS	Base Value of jumps in the 2 <sup>nd</sup> part of FS	Scores of panel for the jumps in the 2 <sup>nd</sup> part of FS with the mark of GOE	% of realization of jumps in the 2 <sup>nd</sup> part of FS
1	Evan LYSACEK	5	35,53	37,77	106,3%
2	Evgeny PLUSHENKO	3	16,83	18,63	110,7%
3	Stephane LAMBIEL	4	23,21	24,81	106,9%
4	Patrick CHAN	5	33	32,4	98,2%
5	Daisuke TAKAHASHI	5	36,08	36,08	100%
6	Johnny WEIR	4	29,81	32,01	107,4%
7	Nabunari ODA	5	35,53	37,53	105,6%
8	Takahiko KOZUKA	5	35,2	29,8	84,7%
9	Jeremy ABBOT	4	30,58	32,18	105,2%
10	Javier FERNANDEZ	5	30,91	30,71	99,4%
11	Michal BREZINA	5	31,35	29,55	94,3%
12	Artem BORODULIN	3	16,28	14,88	91,4%
13	Adrian SHULTHEISS	3	19,91	20,71	104%
14	Denis TEN	2	10,89	11,89	109,2%
15	Florent AMADIO	5	31,57	31,07	98,4%
16	Brian JOUBERT	3	18,48	18,88	102,2%
17	Tomas VERNER	5	21,34	22,56	105,7%
18	Kevin VAN DER PERREN	4	15,84	15,7	99,1%
19	Samuel CONTESTI	5	21,57	15,76	73,1%
20	Viktor PFEIFER	4	23,21	22,81	98,3%
21	Vaughn CHIPEUR	4	19,14	20,7	108,2%
22	Paolo BACHINI	5	20,35	17,95	88,2%
23	Stefan LINDEMANN	4	14,3	15,6	109,1%
24	Anton KOVALEVSKI	3	13,75	13,81	100,4%

From Table 1 you can see the main exponents we receive in our research: the Base Value of jumps in the second part of Free Skating, Scores of Panel for the jumps in the 2nd part of Free Skating, and finally - the percent of realization of jumps in the 2nd part of Free Skating. The percent of realization is some kind of a new term in figure skating theory because it has become possible to count it only since the new ISU Judging System appeared.

After analyzing such competitions in such way we withdraw the results in a different type of a tables. The example of such a table can be seen in Table 2.

*Tab. 2 Average exponents for Men`s Free Skating at the Olympic Games 2010*

	Average Base Value of jumps in the 2 <sup>nd</sup> part of FS	Average value of jumps in the 2 <sup>nd</sup> part of FS with the mark of GOE	Average % of realization of jumps in the 2 <sup>nd</sup> part of FS
The 1 <sup>st</sup> group	29,53	29,69	100,84
The 2 <sup>nd</sup> group	19,19	18,95	99,64

Table 2 shows that we divide the athletes of the competition into two groups. The 1st group is the strongest group of the competition and the 2nd group is the weakest one. Then we compare their results according to our three main exponents. From Table 2 we can see that the results of the 1st group (the stronger one) are much higher than the results of the 2nd group. That proves one of our hypotheses which says that the complex coordination and the reliability of jumps performance in the second part of free programmes among the figure skaters who have the same sports qualification directly depend on athletes' rating.

Other our hypothesis says that the complex coordination and the reliability of jumps performance in the 2nd part of free programmes improve during the season of competitions and during the Olympic cycle. Let's compare the results in Men`s Free Skating on the European Championships 2007 and on the Olympic Games 2010. The results are reflected in table 3.

*Tab. 3 The results in Men`s Free Skating at the European Championships 2007 and at the Olympic Games 2010.*

		Average Base Value of jumps in the 2 <sup>nd</sup> part of FS	Average value of jumps in the 2 <sup>nd</sup> part of FS with the mark of GOE	Average % of realization of jumps in the 2 <sup>nd</sup> part of FS
The 1 <sup>st</sup> group	The Olympics 2010	29,53	29,69	100,84%
	The European Ch. 2007	20.33	19.82	96.02%
The 2 <sup>nd</sup> group	The Olympics 2010	19,19	18,95	99,64%
	The European Ch. 2007	14.34	12.67	85.19%

Table 3 reflects that all exponents have increased a lot among both the strongest group and the weakest one. And that also becomes clear from the diagram 1 which reflects the dynamics of the average percent of realization in Men`s Free Skating on the main competitions in the last Olympic cycle.

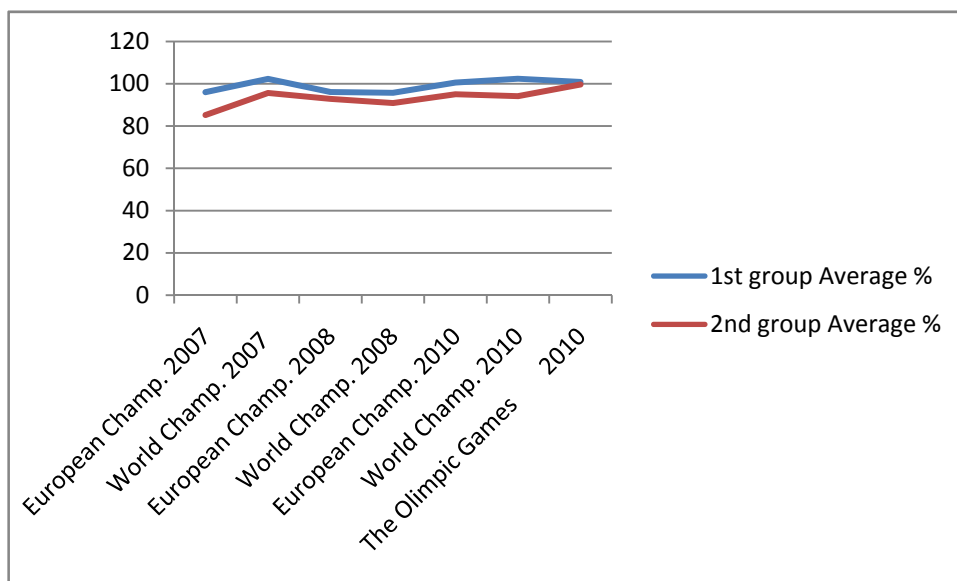


Fig. 1 The dynamics of the average percent of realization in Men`s Free Skating on the main competitions in the Olympic cycle 2007-2010.

From the diagram 1 we can see that all the exponents were increasing during the last Olympic cycle.

## Conclusion

By the example of analysis of Men`s Free Skating you can see the main subject and direction of our research. The statistics shows that the strongest athletes have the higher complex coordination and the reliability of jump performance.

That is why in conclusion, we can say that the performance of jump elements in the second part of Free Skating may not be the main factor which influences the final result. However, we consider this as a complementary chance for athletes to receive higher scores in their Free Skating and to improve their sports results.

## Literature

- [1] ISU Judging Protocols. Retrieved from WWW: [www.isu.org](http://www.isu.org)
- [2] ISU Judging System. ISU *First Aid for Technical Controllers and Technical Specialists. Single Skating*. Edition 2008/2009/
- [3] ISU Communication 1661 *Single and Pair Skating. Special Regulations and Technical Rules*.

## **VÝZKUM KOMPLEXNÍ KOORDINACE A SPOLEHLIVOSTI V PROVÁDĚNÍ SKOKŮ VE DRUHÉ ČÁSTI VOLNÝCH JÍZD KRASOBRUSLAŘSKÝCH PROGRAMŮ**

Provádění komplikovaných koordinačních prvků ve druhé části programu po značném zatížení klade vysoké nároky na parametry a připravenost sportovců, proto je navýšena dodatečným koeficientem, který znásobuje základní hodnoty. V naší práci je analyzována koordinativní obtížnost druhé části programu krasobruslařů, zkoumáme tedy různé zátěže a hodnoty skokových prvků ve druhé části programu. Mimoto je uváděna statistika spolehlivosti těchto skokových prvků pod pojmem „procento uskutečnění“.

## **DIE ERFORSCHUNG DER KOMPLEXEN KOORDINIERUNG UND DER VERLÄSSLICHKEIT VON SPRUNGAUSFÜHRUNGEN IM ZWEITEN TEIL DER FREIEN EISKUNSLAUFPROGRAMME**

Die Ausführung der komplizierten Koordinationssprungelemente im zweiten Teil des Körperprogramms bei der bedeutenden Ermüdung stellt hohe Anforderungen an verschiedene Parameter der Bereitschaft des Sportlers, darum wird sie durch einen zusätzlichen Koeffizienten angespornt, mit dem ihre Basiswerte multipliziert werden. In unserer Arbeit wird die koordinative Schwierigkeit des zweiten Teils des Programms der Eiskunstläufer analysiert, d.h. wir untersuchen Schwierigkeit und die Werte der Sprungelemente im zweiten Teil des Programms. Außerdem wird die Statistik der Zuverlässigkeit der Ausführung dieser Sprungelemente durch den Begriff "Prozent der Verwirklichung" angeführt.

## **BADANIE OGÓLNEJ KOORDYNACJI I PEWNOŚCI WYKONYWANIA SKOKÓW W DRUGIEJ CZĘŚCI JAZD W STYLU DOWOLNYM W PROGRAMACH ŁYŻWIARSTWA FIGUROWEGO**

Wykonywanie skomplikowanych elementów koordynacyjnych w drugiej części programu po znacznym wysiłku stawia wysokie wymagania co do cech i przygotowania sportowców, dlatego zwiększone jest o dodatkowy współczynnik, który zwielokrotnia wartości podstawowe. W niniejszym opracowaniu analizowana jest koordynacyjna trudność drugiej części programu łyżwiarzy figurowych, czyli badamy różne obciążenia i wartości elementów obejmujących skoki w drugiej części programu. Statystyka niezawodności tych figur jest ujmowana pod pojęciem "procent wykonania".