

# The Efficacy of League Formats in Ranking Teams

## Appendix: Tournament Metrics for Several Parameter Combinations

*Jan Lasek and Marek Gagolewski*

The table below presents the detailed estimates of different tournament metrics considered in our study. Each entry in the table corresponds to a different pair of parameters  $(\alpha, \sigma)$  given in the rows and columns, respectively. The table is organised in blocks. Each block corresponds to nine tournament designs studied. The last column gives the short name for the particular league design scheme.

We suggest that the significance of differences between different formats is compared based on the confidence intervals resulting from the normal approximation. That is, the  $1 - \bar{\alpha}$  confidence interval for a sample of observations  $\mathbf{x} = (x_1, x_2, \dots, x_n)$  is:

$$\left( \bar{\mathbf{x}} - \frac{z_{1-\bar{\alpha}/2} \cdot sd(\mathbf{x})}{\sqrt{n}}, \bar{\mathbf{x}} + \frac{z_{1-\bar{\alpha}/2} \cdot sd(\mathbf{x})}{\sqrt{n}} \right),$$

where  $z$  denotes a given quantile of the standard normal distribution and  $\bar{\mathbf{x}}$  and  $sd(\mathbf{x})$  are the sample mean and the sample standard deviation, respectively. The width of this interval is  $\frac{2}{\sqrt{n}} z_{1-\bar{\alpha}/2} \cdot sd(\mathbf{x})$ . Assuming the significance level of  $\bar{\alpha} = 0.05$  and running 100,000 simulations, the three given metrics considered – Kendall's  $\tau$ , Spearman's Footrule distance and the fraction of the best team wins – should be considered with error margins of ca.  $\pm 0.001$ ,  $\pm 0.004$  and  $\pm 0.003$ , respectively. Accordingly, the metric values are rounded to the third decimal digit. These margins should be taken into account when considering the significance of differences between the reported numbers.

	<-	Kendall	->	<-	Spearman	->	<-	Best wins	->	Format
$\alpha \setminus \sigma$	<b>0.1</b>	<b>0.25</b>	<b>0.4</b>	<b>0.1</b>	<b>0.25</b>	<b>0.4</b>	<b>0.1</b>	<b>0.25</b>	<b>0.4</b>	
<b>10</b>	0.463	0.692	0.789	2.319	1.409	1.008	0.383	0.603	0.704	<i>a</i> <sub>1</sub>
<b>10</b>	0.458	0.685	0.781	2.338	1.442	1.039	0.376	0.589	0.691	<i>a</i> <sub>2</sub>
<b>10</b>	0.445	0.676	0.775	2.386	1.477	1.067	0.360	0.578	0.682	<i>b</i>
<b>10</b>	0.421	0.662	0.768	2.484	1.535	1.095	0.363	0.585	0.691	<i>c</i> <sub>1</sub>
<b>10</b>	0.418	0.654	0.760	2.495	1.565	1.127	0.360	0.568	0.677	<i>c</i> <sub>2</sub>
<b>10</b>	0.405	0.644	0.753	2.540	1.606	1.159	0.337	0.553	0.666	<i>d</i> <sub>1</sub>
<b>10</b>	0.403	0.638	0.747	2.548	1.630	1.184	0.331	0.539	0.655	<i>d</i> <sub>2</sub>
<b>10</b>	0.382	0.618	0.731	2.625	1.712	1.253	0.307	0.517	0.631	<i>e</i>
<b>10</b>	0.285	0.510	0.639	2.983	2.135	1.627	0.234	0.412	0.531	<i>f</i>
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<b>20</b>	0.423	0.686	0.787	2.472	1.435	1.015	0.342	0.598	0.703	<i>a</i> <sub>1</sub>
<b>20</b>	0.416	0.678	0.780	2.498	1.471	1.046	0.332	0.583	0.690	<i>a</i> <sub>2</sub>
<b>20</b>	0.405	0.669	0.773	2.539	1.503	1.074	0.323	0.573	0.683	<i>b</i>
<b>20</b>	0.385	0.657	0.766	2.617	1.555	1.101	0.325	0.579	0.692	<i>c</i> <sub>1</sub>
<b>20</b>	0.380	0.649	0.759	2.635	1.588	1.134	0.316	0.562	0.678	<i>c</i> <sub>2</sub>
<b>20</b>	0.369	0.638	0.751	2.675	1.630	1.167	0.302	0.547	0.667	<i>d</i> <sub>1</sub>
<b>20</b>	0.365	0.631	0.745	2.688	1.658	1.193	0.298	0.533	0.654	<i>d</i> <sub>2</sub>
<b>20</b>	0.345	0.612	0.729	2.761	1.737	1.261	0.276	0.513	0.631	<i>e</i>
<b>20</b>	0.255	0.503	0.637	3.090	2.162	1.634	0.213	0.405	0.531	<i>f</i>
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<b>100</b>	0.410	0.685	0.787	2.519	1.441	1.016	0.334	0.599	0.704	<i>a</i> <sub>1</sub>
<b>100</b>	0.403	0.676	0.779	2.547	1.477	1.048	0.321	0.582	0.691	<i>a</i> <sub>2</sub>
<b>100</b>	0.392	0.668	0.773	2.585	1.511	1.076	0.317	0.574	0.683	<i>b</i>
<b>100</b>	0.375	0.656	0.766	2.656	1.560	1.103	0.315	0.579	0.692	<i>c</i> <sub>1</sub>
<b>100</b>	0.368	0.647	0.758	2.680	1.594	1.136	0.304	0.561	0.676	<i>c</i> <sub>2</sub>
<b>100</b>	0.357	0.636	0.751	2.719	1.639	1.169	0.294	0.547	0.664	<i>d</i> <sub>1</sub>
<b>100</b>	0.352	0.630	0.744	2.736	1.665	1.196	0.285	0.534	0.651	<i>d</i> <sub>2</sub>
<b>100</b>	0.334	0.610	0.728	2.804	1.745	1.263	0.270	0.510	0.632	<i>e</i>
<b>100</b>	0.247	0.502	0.637	3.122	2.169	1.637	0.208	0.406	0.532	<i>f</i>
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$\infty$	0.409	0.685	0.787	2.522	1.441	1.015	0.334	0.598	0.704	<i>a</i> <sub>1</sub>
$\infty$	0.402	0.676	0.779	2.549	1.477	1.047	0.322	0.582	0.693	<i>a</i> <sub>2</sub>
$\infty$	0.392	0.668	0.773	2.587	1.510	1.075	0.315	0.574	0.681	<i>b</i>

	<-	Kendall	->	<-	Spearman	->	<-	Best wins	->	Format
$\infty$	0.375	0.655	0.767	2.655	1.562	1.099	0.317	0.577	0.692	$c_1$
$\infty$	0.369	0.647	0.759	2.678	1.595	1.132	0.305	0.560	0.676	$c_2$
$\infty$	0.357	0.636	0.751	2.719	1.638	1.166	0.296	0.548	0.665	$d_1$
$\infty$	0.352	0.630	0.745	2.736	1.665	1.193	0.286	0.534	0.652	$d_2$
$\infty$	0.334	0.610	0.729	2.805	1.742	1.260	0.272	0.512	0.632	$e$
$\infty$	0.247	0.502	0.637	3.120	2.166	1.636	0.208	0.407	0.532	$f$