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Erratum: Equivalence of compositional expressions and independence relations in compositional models


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ERRATUM: EQUIVALENCE OF COMPOSITIONAL EXPRESSIONS AND INDEPENDENCE RELATIONS IN COMPOSITIONAL MODELS

FRANCESCO M. MALVESTUTO

In the Closing Note of the article [1] (see page 352), the number of simple compositional expressions was calculated incorrectly. Recall that a compositional expression is simple if it contains exactly one subexpression of the form “X ⊲ Y”. The correct number \( s^*_n \) of simple compositional expressions with \( n \) sets, \( n \geq 2 \), is

\[
s^*_n = \begin{cases} 
2 & \text{if } n = 2 \\
2 \cdot (n-2) \cdot n! & \text{otherwise} 
\end{cases} 
\]

which for \( n > 3 \) is larger than that reported in [1]. The error has no effect on the rest of the article, except that the table reported at page 353 of the article should be

<table>
<thead>
<tr>
<th>( n )</th>
<th>( s_n )</th>
<th>( s^*_n )</th>
<th>( e_n )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
<td>96</td>
<td>120</td>
</tr>
<tr>
<td>5</td>
<td>120</td>
<td>720</td>
<td>1680</td>
</tr>
</tbody>
</table>

In order to prove [1], consider first the simple compositional expressions with a given base sequence, say \((X_1, \ldots, X_n)\). Such a simple compositional expression contains exactly one subexpression of the form “\( X_i \triangleright X_{i+1} \)” for some \( i, 1 \leq i \leq n-1 \).

If \( n = 2 \) then trivially we have only one simple compositional expression, namely \( X_1 \triangleright X_2 \).

If \( n = 3 \) then we have only two simple compositional expression, namely \((X_1 \triangleright X_2) \triangleright X_3\) and \( X_1 \triangleright (X_2 \triangleright X_3) \).

Assume that \( n \geq 4 \) and let us distinguish the following three cases.

Case 1: \( i = 1 \). We have only the following simple compositional expression

\[
(\ldots (X_1 \triangleright X_2) \triangleright \ldots) \triangleright X_n .
\]
Case 2: \( i = n - 1 \). We have only the following simple compositional expression

\[ X_1 \triangleright (X_2 \ldots \triangleright (X_{n-1} \triangleright X_n) \ldots) . \]

Case 3: \( 2 \leq i \leq n - 2 \). We have only the following two simple compositional expressions

\[
\begin{align*}
\ldots & \ldots ((X_1 \triangleright (\ldots \triangleright (X_i \triangleright X_{i+1}) \ldots )) \triangleright X_{i+2}) \triangleright \ldots \triangleright X_{n-1}) \triangleright X_n \\
& X_1 \triangleright (\ldots \triangleright ((\ldots ((X_i \triangleright X_{i+1}) \triangleright X_{i+2}) \triangleright \ldots ) \triangleright X_{n-1}) \triangleright X_n) \ldots .
\end{align*}
\]

Therefore, for \( n \geq 3 \) the number of simple compositional expressions with the same base sequence is \( 2 + 2 \cdot (n - 3) = 2 \cdot (n - 2) \). Finally, since the number of possible base sequences is \( n! \), we get [1].

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REFERENCES


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