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J. Bokowski
and NJAS
Emails, June 1994

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To Juergen Bokowski
From Neil Sloane

Hi! Eli Goodman said that perhaps you could tell me a sequence
of integers: the number of simple order types of n points
in the plane. Eli said you know the exact values for small n.

I am collecting sequences for a new edition of my Handbook of
Integer Sequences.

If you could send me these numbers I would be very grateful!

Neil Sloane
From CUNYVM.CUNY.EDU!XBR1DB0N%DDATHD21.BITNET Sat Jun 29 16:37:04 +0100 1991
Received: by gauss; Sat Jun 29 10:35:26 EDT 1991
Received: by inet.att.com; Sat Jun 29 10:35 EDT 1991
Received: from DDATHD21.BITNET by CUNYVM.CUNY.EDU (IBM VM SMTP R1.2.2MX) with BSMTP id 6
Received: from BR1.THD.DA.D.EUROPE by DDATHD21.BITNET
via GNET with RJE ; 29 Jun 91 16:35:11
Date: Sat, 29 Jun 91 16:37:04 +0100 (Central European Time)
From: XBR1DB0N%DDATHD21.BITNET@CUNYVM.CUNY.EDU (Juergen Bokowski)
Subject: order types
To: njas@research.att.com
X-VMS-To: X%"njas@research.att.com"
Status: R

Hi! Thanks for your interest in results on order types.

To get the number of simple order types (realizable uniform oriented matroids),
the numbers in the following table
have to be multiplied by $2^n$. But then you have to discard the isomorphic ones
(according to the symmetries).
Best regards Juergen Bokowski

This is a plain TEX file:

```
\vskip 0.5cm

\noindent {\bf Table 3.1. Reorientation classes of uniform oriented matroids for
 given rank and number of points.}
$$\hbox{\bf total number : number of non-realizable ones}$$
$$\matrix {
\hbox {\bf rank}
              &      &      &             &                          &
                     &               \cr
\bf {7}       &      &      &             &                          &     1:0
                     &               \cr
              &      &      &             &                          &
                     &               \cr
\bf {6}       &      &      &             &           1:0            &    4382:1
                     &               \cr
              &      &      &             &                          &
                     &               \cr
\bf {5}       &      &      &     1:0     &         135:0            & = (9 \hbox
{ pts,}\hbox{ rank }4)&               \cr
              &      &      &             &                          &
                     &               \cr
```

```
\bf {4}       &      & 1:0  &    11:0     &        2628:24          & \hbox {non
-real. examples }     &                \cr
              &      &      &             &\hbox{Bo / RG}           & \hbox { by
 extensions }         &                \cr
              &      &      &             &          \hbox {  }     &
                     &                \cr
\bf {3}       & 1:0  & 4:0  &    11:0     &         135:0           &    4382:1
                     &312.356:known  \cr
              &      &      &\hbox{Gr}    & \hbox { Go/Po, (Ha/Ca) }&\hbox {RG,
La/GS }               &\hbox{Bo/La/RG}\cr
              &      &      &             &                         &
                     &                \cr
\hbox{\bf
  points}     &\bf{5}&\bf{6}&   \bf{7}    &   \bf {8}               &    \bf {9}
                     & \bf{10}   \cr
}$$

\noindent Authors in the table above:
Bo = Bokowski,J.,
Ca = Canham,
Go = Goodman,E.,
Gr = Gr\"unbaum,B.,
GS = Gonzalez--Sprinberg,
Ha = Halsey,
La = Laffaille, G.,
Po = Pollack,R.,
RG = Richter--Gebert,J.

Here are some references which might be of interest to you:
@article{  Al86,
author=      "Alon, N.",
title=       "The number of polytopes, configurations and real matroids",
journal=     "Mathematika",
volume=      "33",
year=        "1986",
pages=       "62--71",}

@unpublished{ BoRG90,
author=         "Bokowski, J. and Richter-Gebert, J.",
title=          "Reduction theorems for oriented matroids",
note=           "Manuscript, submitted",
year=           "1990",
pages=          "16"}

@unpublished{ BoRG91a,
author=         "Bokowski, J. and Richter--Gebert, J.",
title=          "On the classification of non-realizable oriented matroids",
note=           "Manuscript",
year=           "1991",
pages=          "16"}

@unpublished{BoRGSc91,
author=      "Bokowski, J. and Richter--Gebert, J. and Schindler, W.",
title=       "On the distribution of order types",
note=        "Computational Geometry, to appear",
year=        "1990",
```

```
pages=       "1--11"}

@article{Ri89Dipl,
author=       "Richter, J.",
title=        {Kombinatorische {R}ealisierbarkeitskriterien f\"ur orientierte {M
}atroide},
journal=      "Mitteilungen aus dem Math. Sem. Gie\ss{}en",
note=         "Diplomthesis, University Darmstadt, 1988",
volume=       "194",
year=         "1989",
pages=        "1--113"}
\bye
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**Table 3.1. Reorientation classes of uniform oriented matroids for given rank and number of points.**

**total number : number of non-realizable ones**

| rank | | | | | | |
|---|---|---|---|---|---|---|
| **7** | | | | | 1 : 0 | |
| **6** | | | | 1 : 0 | 4382 : 1 | |
| **5** | | | 1 : 0 | 135 : 0 | = (9 pts, rank 4) | |
| **4** | | 1 : 0 | 11 : 0 | 2628 : 24<br>Bo / RG | non -real. examples<br>by extensions | |
| **3** | 1 : 0 | 4 : 0 | 11 : 0<br>Gr | 135 : 0<br>Go/Po, (Ha/Ca) | 4382 : 1<br>RG, La/GS | 312.356 : *known*<br>Bo/La/RG |
| **points** | **5** | **6** | **7** | **8** | **9** | **10** |

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Authors in the table above: Bo = Bokowski,J., Ca = Canham, Go = Goodman,E., Gr = Grünbaum,B., GS = Gonzalez–Sprinberg, Ha = Halsey, La = Laffaille, G., Po = Pollack,R., RG = Richter–Gebert,J.

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@unpublished BoRG90, author= "Bokowski, J. and Richter-Gebert, J.", title= "Reduction theorems for oriented matroids", note= "Manuscript, submitted", year= "1990", pages= "16"

@unpublished BoRG91a, author= "Bokowski, J. and Richter–Gebert, J.", title= "On the classification of non-realizable oriented matroids", note= "Manuscript", year= "1991", pages= "16"

@unpublishedBoRGSc91, author= "Bokowski, J. and Richter–Gebert, J. and Schindler, W.", title= "On the distribution of order types", note= "Computational Geometry, to appear", year= "1990", pages= "1–11"

@articleRi89Dipl, author= "Richter, J.", title= Kombinatorische Realisierbarkeitskriterien für orientierte M atroide, journal= "Mitteilungen aus dem Math. Sem. Gießen", note= "Diplomthesis, University Darmstadt, 1988", volume= "194", year= "1989", pages= "1–113"