

[Match](#)

Issue 45, 2002, Pages 55-70

Document Type: Article

[View references](#) (41)

Relations between the permanental and characteristic polynomials of fullerenes and benzenoid hydrocarbons

[Gutman, I.](#), [Cash, G.G.](#)

Faculty of Science, University of Kragujevac, P. O. Box 60, YU-34000 Kragujevac, Yugoslavia

Abstract

In earlier computer-aided studies the permanental polynomials of numerous fullerenes and benzenoid hydrocarbons were determined. Several relations between the coefficients of the permanental and characteristic polynomials were then observed. We now demonstrate the general validity of these empirically discovered regularities and establish a few more.

References (41)

 Select: All

1. [Gutman, I.](#), [Polansky, O.E.](#)
(1986) *Mathematical Concepts in Organic Chemistry*, [Cited 312 times](#)
Springer-Verlag, Berlin
2. [Bonchev, D.](#), [Rouvray, D.H.](#)
(1991) *Chemical Graph Theory - Introduction and Fundamentals*, [Cited 49 times](#)
Gordon & Breach, New York
3. [Trinajstić, N.](#)
(1992) *Chemical Graph Theory, Second Edition*, [Cited 650 times](#)
CRC Press, Boca Raton
4. [Dias, J.R.](#)
(1993) *Molecular Orbital Calculations Using Chemical Graph Theory*, [Cited 67 times](#)
Springer-Verlag, Berlin
5. [Diudea, M.V.](#), [Gutman, I.](#), [Jäntschi, L.](#)
(2001) *Molecular Topology*, [Cited 13 times](#)
Nova, Huntington, N. Y.
6. [Sachs, H.](#)
Beziehungen zwischen den in einem graphen entaltenen kreisen and seinem charakteristischen polynom
(1964) *Publ. Math. (Debrecen)*, 11 pp. 119-134 [Cited 23 times](#)
7. [Cvetković, D.](#), [Doob, M.](#), [Sachs, H.](#)
(1980) *Spectra of Graphs - Theory and Application*, [Cited 210 times](#)
Academic Press, New York; 2nd revised ed.: Barth, Heidelberg
8. [Minc, H.](#)
(1978) *Permanents*, [Cited 39 times](#)
Addison-Wesley, Reading, Mass.
9. [Kasum, D.](#), [Trinajstić, N.](#), [Gutman, I.](#)
Chemical graph theory. III. On the permanental polynomial
(1981) *Croat. Chem. Acta*, 54 pp. 321-328 [Cited 8 times](#)
10. [Merris, R.](#), [Rebman, K.R.](#), [Watkins, W.](#)

Cited By

This article has been cited **5** times in Scopus:
(Showing the 3 most recent)

. [Si, C.R.](#)
A note on the relations between the permanental and characteristic polynomials of coronoid hydrocarbons
(2004) *Match*

. [Cash, G.G.](#), [Gutman, I.](#)
The lapacian permanental polynomial: Formulas and algorithms
(2004) *Match*

. [Yan, W.](#), [Zhang, F.](#)
On the permanental polynomials of some graphs
(2004) *Journal of Mathematical Chemistry*

[View details of all 5 citations](#)

[Alert me](#) when this document is cited in Scopus

[Related Documents](#)
(by reference)

Permanent polynomials of graphs(1981) *Lin. Algebra Appl.*, 38 pp. 273-288 [Cited 8 times](#)[View at Publisher](#)

11. [Rosenfeld, V.R.](#), [Gutman, I.](#)
A novel approach to graph polynomials
(1989) *Commun. Math. Chem. (MATCH)*, 24 pp. 191-199 [Cited 9 times](#)
12. [Schultz, H.P.](#), [Schultz, E.B.](#), [Schultz, T.P.](#)
Topological organic chemistry. 4. Graph theory, matrix permanents and topological indices of alkanes
(1992) *J. Chem. Inf. Comput. Sci.*, 32 pp. 69-72 [Cited 11 times](#)
[View at Publisher](#)
13. [Cash, G.G.](#)
A fast computer algorithm for finding the permanent of adjacency matrices
(1995) *J. Math. Chem.*, 18 pp. 115-119 [Cited 10 times](#)
[View at Publisher](#)
14. [Cash, G.G.](#)
Permanents of adjacency matrices of fullerenes
(1997) *Polyc. Arom. Comp.*, 12 pp. 61-69 [Cited 13 times](#)
[Abstract + Refs](#)
15. [Cash, G.G.](#)
The permanent polynomial
(2000) *J. Chem. Inf. Comput. Sci.*, 40 pp. 1203-1206 [Cited 9 times](#)
[Abstract + Refs](#) [View at Publisher](#)
16. [Cash, G.G.](#)
Permanent polynomials of the smaller fullerenes
(2000) *J. Chem. Inf. Comput. Sci.*, 40 pp. 1207-1209 [Cited 7 times](#)
[Abstract + Refs](#) [View at Publisher](#)
17. [Gutman, I.](#)
Permanents of adjacency matrices and their dependence on molecular structure
(1998) *Polyc. Arom. Comp.*, 12 pp. 281-287 [Cited 3 times](#)
[Abstract + Refs](#)
18. [Botti, P.](#), [Merris, R.](#)
Almost all trees share a complete set of immanantal polynomials
(1993) *J. Graph Theory*, 17 pp. 467-476 [Cited 9 times](#)
19. [Balasubramanian, K.](#)
Imminant polynomials of graphs
(1993) *Theor. Chim. Acta*, 85 pp. 379-390 [Cited 3 times](#)
[View at Publisher](#)
20. [Graovac, A.](#), [Gutman, I.](#), [Trinajstić, N.](#)
(1977) *Topological Approach to the Chemistry of Conjugated Molecules*, [Cited 97 times](#)
Springer-Verlag, Berlin
21. [Graovac, A.](#), [Gutman, I.](#), [Trinajstić, N.](#), [Živković, T.](#)
Graph theory and molecular orbitals. Application of Sachs theorem
(1972) *Theor. Chim. Acta*, 26 pp. 67-78
[View at Publisher](#)
22. [Gutman, I.](#), [Trinajstić, N.](#)
Graph theory and molecular orbitals
(1973) *Topics Curr. Chem.*, 42 pp. 49-93 [Cited 27 times](#)
23. [Aihara, J.](#)
General rules for constructing Hückel molecular orbital characteristic polynomials
(1976) *J. Amer. Chem. Soc.*, 98 pp. 6840-6844 [Cited 13 times](#)
[View at Publisher](#)
24. [Trinajstić, N.](#)
Computing the characteristic polynomial of a conjugated system using the Sachs theorem
(1977) *Croat. Chem. Acta*, 49 pp. 539-633

25. [Herndon, W.C., Ellzey, M.L.](#)
Procedures for obtaining graph-theoretical resonance energies
 (1979) *J. Chem. Inf. Comput. Sci.*, 19 pp. 260-264 [Cited 3 times](#)
 [Abstract + Refs](#) [View at Publisher](#)
26. [Dias, J.R.](#)
An example of molecular orbital calculation using the Sachs graph method
 (1992) *J. Chem. Educ.*, 69 pp. 695-700 [Cited 4 times](#)
27. [Gutman, I., Cyvin, S.J.](#)
 (1989) *Introduction to the Theory of Benzenoid Hydrocarbons*, [Cited 228 times](#)
 Springer-Verlag, Berlin
28. [Fowler, P.W., Manolopoulos, D.E.](#)
 (1995) *An Atlas of Fullerenes*, [Cited 402 times](#)
 Clarendon Press, Oxford
29. [Fowler, P.W.](#)
 (1996) *Mathematical Aspects of the Fullerenes, special issue of Communications in Mathematical and in Computer Chemistry (MATCH)*, 33
30. [Schulman, J.M., Disch, R.L., Miller, M.A., Peck, R.C.](#)
Symmetrical clusters of carbon atoms: The C₂₄ and C₆₀ molecules
 (1987) *Chem. Phys. Lett.*, 141 pp. 45-48 [Cited 33 times](#)
 [View at Publisher](#)
31. [Gao, Y.-D., Herndon, W.C.](#)
Fullerenes with four-membered rings
 (1993) *J. Amer. Chem. Soc.*, 115 pp. 8459-8460 [Cited 40 times](#)
 [Abstract + Refs](#) [View at Publisher](#)
32. [Babić, D., Trinajstić, N.](#)
Stability of fullerenes with four-membered rings
 (1995) *Chem. Phys. Lett.*, 237 pp. 239-245 [Cited 22 times](#)
 [View at Publisher](#)
33. [Fowler, P.W., Heine, T., Manolopoulos, D.E., Mitchell, D., Orlandi, G., Schmidt, R., Seifert, G., Zerbetto, F.](#)
Energetics of fullerenes with four-membered rings
 (1996) *J. Phys. Chem.*, 100 pp. 6984-6991 [Cited 44 times](#)
 [View at Publisher](#)
34. [Fowler, P.W., Heine, T., Mitchell, D., Schmidt, R., Seifert, G.](#)
Boron-nitrogen analogues of the fullerenes: The isolated-square rule
 (1996) *J. Chem. Soc. Faraday Trans.*, 92 pp. 2197-2201 [Cited 35 times](#)
 [View at Publisher](#)
35. [Seifert, G., Fowler, P.W., Mitchell, D., Porezag, D., Frauenheim, T.](#)
Boron-nitrogen analogues of the fullerenes: Electronic and structural properties
 (1997) *Chem. Phys. Lett.*, 268 pp. 352-358 [Cited 65 times](#)
 [Abstract + Refs](#) [View at Publisher](#)
36. [Fowler, P.W., Rogers, K.M., Seifert, G., Terrones, M., Terrones, H.](#)
Pentagonal rings and nitrogen excess in fullerene-based BN cages and nanotube caps
 (1999) *Chem. Phys. Lett.*, 299 pp. 359-367 [Cited 50 times](#)
 [Abstract + Refs](#) [View at Publisher](#)
37. [Bengu, E., Marks, L.D.](#)
Single-walled BN nanostructures
 (2001) *Phys. Rev. Lett.*, 86 pp. 2385-2387 [Cited 69 times](#)
 [Abstract + Refs](#) [View at Publisher](#)
38. [Kirby, E.C.](#)
Recent work on toroidal and other exotic fullerene structures
 (1997) *From Chemical Topology to Three-Dimensional Geometry*, pp. 263-296 [Cited 13 times](#)
 A. T. Balaban (Ed.), Plenum Press, New York
39. [Cash, G.G.](#)
A simple means of computing the Kekulé structure count for toroidal polyhex fullerenes

(1998) *J. Chem. Inf. Comput. Sci.*, 38 pp. 58-61 [Cited 12 times](#)

[Abstract + Refs](#) [View at Publisher](#)

40. [Liu, J.](#), [Dai, H.](#), [Hafner, J.](#), [Colbert, D.](#), [Tans, S.J.](#), [Dekker, C.](#), [Smalley, R.E.](#)

Fullerene crop circles

(1997) *Nature*, 385 pp. 780-781 [Cited 162 times](#)

[Abstract + Refs](#) [View at Publisher](#)


41. [Han, J.](#)

Toroidal single wall carbon nanotubes in fullerene crop circles

(1997) *NASA Advanced Supercomputing Technical Report #NAS-97-015*,

<http://www.nas.nasa.gov/Research/Reports/Techreports/1997/nas-97-015-abstract.html>

[View on Web](#)

 Gutman, I.; Faculty of Science, University of Kragujevac, P. O. Box 60, YU-34000 Kragujevac, Yugoslavia; email:gutman@knez.uis.kg.ac.yu
© Copyright 2004 Elsevier Science B.V., Amsterdam. All rights reserved.

Match

Issue 45, 2002, Pages 55-70

[4 results list](#) [4 previous](#) **12 of 32** [next >](#)

[Search](#) [Sources](#) [My Alerts](#) [My List](#) [My Profile](#)

[Help](#) [Scopus Labs](#)

[About Scopus](#) | [Feedback](#) | [Terms & Conditions](#) | [Privacy Policy](#)

Copyright © 2006 [Elsevier B.V.](#) All rights reserved. Scopus™ is a registered trademark of Elsevier B.V.