UNIVERSITY OF KRAGUJEVAC
FACULTY OF SCIENCE

| May 16 - 19 | 2018 | Kragujevac | Serbia |

14 SMAK

SERBIAN MATHEMATICAL CONGRESS

BOOK OF ABSTRACTS

UNIVERSITY OF KRAGUJEVAC
FACULTY OF SCIENCE

XIV SERBIAN MATHEMATICAL CONGRESS
(14SMAK 2018)

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May 16–19, 2018

Kragujevac, Serbia

Book of Abstracts
XIV Sebian Mathematical Congress, May 16–19, 2018
Kragujevac, Serbia
https://imi.pmf.kg.ac.rs/kongres
ISBN 978-86-6009-055-5

Published By:

Faculty of Science
University of Kragujevac
Radoja Domanovića 12
34000 Kragujevac
Serbia
Tel.: +381 (0)34 336223
Fax: +381 (0)34 335040
Website: http://pmf.kg.ac.rs

Edited By: Tatjana Tomović
Front Cover: Željko Mališić
Printed By: InterPrint, Kragujevac, Serbia

Face enumeration on matroid base polytope

Marko Pešović[1]

[1]Department of Mathematics, Physics and Descriptive Geometry, Faculty of Civil Engineering, University of Belgrade, Serbia, mpesovic@grf.bg.ac.rs

To a generalized permutohedron Q is associated the quasisymmetric function $F(Q)$, defined in [1], which enumerates positive integer lattice points lying in maximal cones of the normal fan of Q. In [2] is defined its weighted refinements $F_q(Q)$

$$F_q(Q) := \sum_{\omega \in \mathbf{Z}_+^n} q^{\mathrm{rk}_Q(\mathcal{F}_\omega)} x_{\omega_1} x_{\omega_2} \cdots x_{\omega_n},$$

where $\mathrm{rk}_Q(\mathcal{F}_\omega)$ is a rank function on the face poset of the standard permutohedron determined by Q. Particularly, the enumerator $F_q(Q)$ contains the information about the f-vector of the generalized permutohedron Q. We study the special case of matroid base polytopes $Q = P_M$ and calculate their f-vectors. We also show that the corresponding weighted quassisymmetric enumerator $F_q(P_M)$ coincides with a universal morphism of combinatorial Hopf algebras of matroids to quasisymmetric functions.

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