

2-nearly Platonic graphs

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A 2-nearly Platonic graph of type (k, d) is a k -regular plane graph with f faces, $f - 2$ of which are of size d and the remaining two are of sizes d_1, d_2 , both different from d . Such a graph is called balanced if $d_1 = d_2$. We show that all connected 2-nearly Platonic graphs are balanced. This proves a recent conjecture by Keith, Froncek, and Kreher. We also show that any 2-nearly Platonic graph belongs to one of 15 well defined infinite classes. The latter states more precisely the statement of Deza, Dutour Sikirič, and Shtogrin from 2013, and of Froncek, Khorsandi, Musawi, and Qui from 2021 that there are only 14 such classes. Moreover, our short proof provides a complete characterization of all 2-nearly Platonic graphs.

References

- [1] S.Jendrol', 2-nearly Platonic graphs, *Discuss. Math. Graph Theory* Accepted, <https://doi.org/10.7151/dmgt.2446>.