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The generalized Reye configuration

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Abstract

Given an embedding in the plane of the vertices of a cube, we consider conditions on the embedded vertices such that they are the projection of the vertices of a 3 dimensional polyhedron combinatorially equivalent to the cube. We are particularly interested in conditions expressible as incidence conditions for the lines induced by the given vertex set in the plane. We show that the vertices and their incidences extend to a Reye configuration in the plane if and only if the vertices are the projection of a parallelepiped. More generally, the positions of the embedded vertices result from projecting a polyhedron combinatorially equivalent to the cube if and only if they belong to a plane configuration we call the generalized Reye configuration.

Keywords: Reye's configuration, generic picture, sharp lift.

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Posplošena Reyeva konfiguracija

Povzetek

Obravnavamo vprašanje, kakšnim pogojem morajo zadoščati vozlišča kocke, vložena v ravnino, da bi predstavljala projekcije oglišč trirazsežnega poliedra, kombinatorično ekvivalentnega kocki. Še posebej nas zanimajo pogoji, ki jih je mogoče izraziti kot incidenčne pogoje za premice inducirane z dano množico vozlišč v ravnini. Pokažemo, da je mogoče vozlišča in njihove incidence razširiti na Reyeho konfiguracijo v ravnini natanko tedaj, ko so ta vozlišča projekcije oglišč paralelepipeda. Splošneje, v ravnino vložena vozlišča so projekcije oglišč poliedra kombinatorično ekvivalentnega kocki natanko tedaj, ko pripadajo t.i. posplošeni Reyevi konfiguraciji.

Ključne besede: Reyeva konfiguracija, generična slika, oster dvig.