

Pensieve Header: In Duzhin's world, a diagram with a single trivalent vertex need not be 0. This disproves a conjecture in <http://katlas.math.toronto.edu/drorbn/bbs/show?shot=LazyKnots-110607-171439.jpg>.

```

F[x_, y_, z_] := Det[
$$\begin{pmatrix} x[1] & x[2] & x[3] \\ y[1] & y[2] & y[3] \\ z[1] & z[2] & z[3] \end{pmatrix}$$
];

dot[x_, y_] := x[1] y[1] + x[2] y[2] + x[3] y[3];
Symmetrize[vars_, expr_] :=
  Sum[expr /. Thread[vars -> p], {p, Permutations[vars]}];
AntiSymmetrize[vars_, expr_] :=
  Sum[Signature[p] * expr /. Thread[vars -> p], {p, Permutations[vars]}];

Factor[
  Symmetrize[{a, b, c, d, e}, F[a, b, c] dot[b, d] dot[c, e]]
]
0

Factor[
  Symmetrize[{a, b, c, d, e, f}, F[a, b, c] dot[b, d] dot[c, e] dot[e, f]]
]

```

A very large output was generated. Here is a sample of it:

```

2 (6 a[2] a[3] b[1] b[2] c[1] c[2] d[1] e[1] f[1] -
  3 a[1] a[3] b[2]^2 c[1] c[2] d[1] e[1] f[1] - 3 a[2]^2 b[1] b[3] c[1] c[2] d[1] e[1] f[1] +
  3 a[3]^2 b[1] b[3] c[1] c[2] d[1] e[1] f[1] + 6 a[1] a[2] b[2] b[3] c[1]
  c[2] d[1] e[1] f[1] + <<32927>> + a[1] b[2]^2 c[2] d[3] e[3]^2 f[3]^2 +
  2 a[1] b[1] c[1] c[2] d[3] e[3]^2 f[3]^2 - 2 a[2] b[2] c[1] c[2] d[3] e[3]^2 f[3]^2 +
  a[2] b[1] c[2]^2 d[3] e[3]^2 f[3]^2 + a[1] b[2] c[2]^2 d[3] e[3]^2 f[3]^2)

```

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