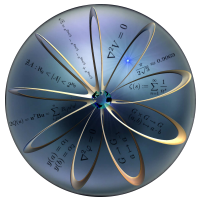

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vector product in general vector spaces

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The vector product can be defined in any finite dimensional vector space V with $\dim V = n$. Let $v_1, \ldots, v_n$ be a basis of V, we then define the vector product of the vectors $w_1, \ldots, w_{n-1}$ in the following way:

$$w_1 \times \cdots \times w_{n-1} = \sum_{j=1}^{n} v_j \det(w_1, \ldots, w_{n-1}, v_j).$$

One can easily see that some of the properties of the vector product are the same as in $\mathbb{R}^3$:

- If one of the w_i is equal to 0, then the vector product is 0.
- If w_i are linearly dependent, then the vector product is 0.
- In a Euclidean vector space $w_1 \times \cdots \times w_{n-1}$ is perpendicular to all w_i.