

1.34: Direct space

The direct space (or *crystal space*) is the *point space*, E^n , in which the structures of finite real crystals are idealized as infinite perfect three-dimensional structures. To this space one associates the *vector space*, V^n , of which lattice and translation vectors are elements. It is a *Euclidean* space where the scalar product of two vectors is defined. The two spaces are connected through the following relations:

- (i) To any two points P and Q of the point space E^n a vector $\mathbf{PQ} = \mathbf{r}$ of the vector space V^n is attached
 - (ii) For each point P of E^n and for each vector \mathbf{r} of V^n there is exactly one point Q of E^n for which $\mathbf{PQ} = \mathbf{r}$ holds
 - (iii) If R is a third point of the point space, $\mathbf{PQ} + \mathbf{QR} = \mathbf{PR}$
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