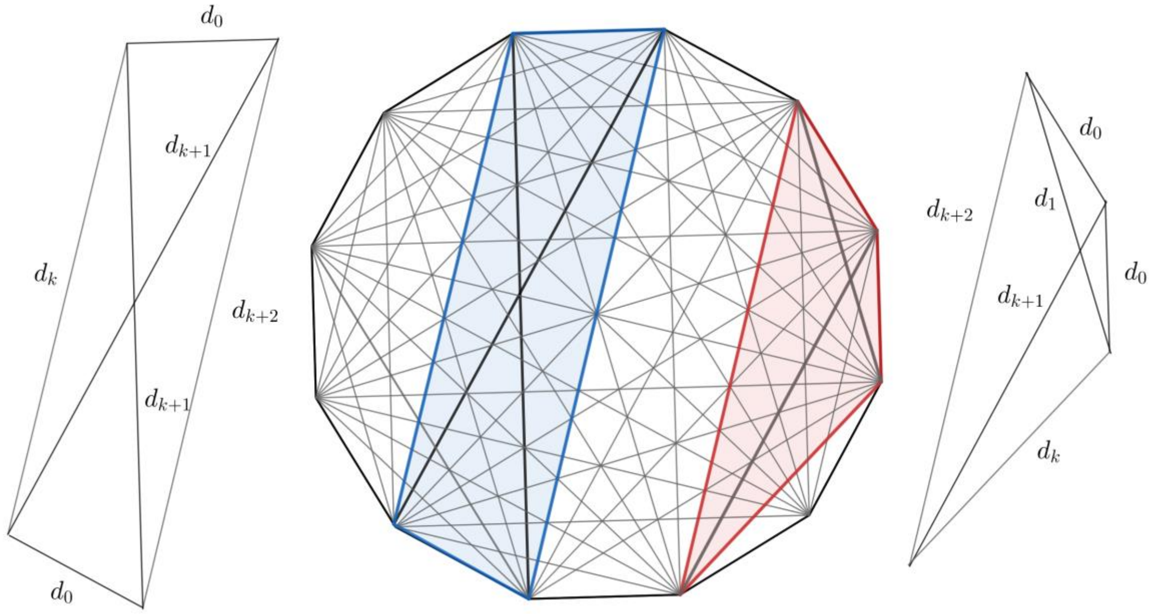
5.2.3 Other relations between the diagonals of a regular polygon



The red cyclic quadrilateral is the one we have already used. Applying Ptolemy's theorem in the blue one, a regular trapezium, gives:

${d_0}^2 + d_k d_{k+2} = {d_{k+1}}^2$. Again setting $d_0 = 1$,
$1 + d_k d_{k+2} = {d_{k+1}}^2$, or:
$(d_{k+1} + 1)(d_{k+1} - 1) = d_k d_{k+2}$.

Notice as in **5.2.2** the implied identity:

$$(\sin(k+2)\varphi)^2 - (\sin\varphi)^2$$
$$= \sin(k+1)\varphi . \sin(k+3)\varphi$$

for $k \in Z$.