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Title: Schall- und Brechungsfronten an ebenen Kurven

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In applied acoustic or optics the following problem is very important: Given a plane curve c , a sound resp. light point S and a time component L_0 . If every sonic or light ray is reflected or refracted on c in such a way, that holds $\overline{SP} + \overline{PY_1} = L_0$ (P is a point of c) resp. $\overline{SP} + \overline{PY_2} = L_0$, the set of points Y_1 resp. Y_2 define a curve $\tilde{c}_1$ resp. $\tilde{c}_2$, called the reflective curve (sonic wave front) resp. the refractive curve of c with respect to the centre S and the time component L_0 . At first we derive parametric representations of $\tilde{c}_1$ resp. $\tilde{c}_2$ in connection with the first and second central curve k_1 resp. k_2 . We show that k_2 is the counter-point curve of the point S with regard to the evolute c^* of c . We investigate the corresponding catacaustic h and give a geometrical construction of the contact point of h with the reflected ray, if the point S and the pedal curve with regard to the reflected rays are known. Furthermore we give a kinematical generation of the refractive curves $\tilde{c}_2$, using the second central curve k_2 and the catacaustic h . Finally we investigate – as an application – the special cases, if c is a straight line (in this case the curves $\tilde{c}_2$ are conchoids of NIKOMEDES) or a circle (in this case the curves $\tilde{c}_2$ are rather complicated, the catacaustic h is the evolute of a PASCAL limaçon).

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