Location invariant inspection of cogwheels

An example for solving an industrial visual inspection task

Interpretation of Fourier descriptors

For nonlinearly extracted Fourier descriptors the properties of Fourier coefficients adhere, because the FD can be interpreted as FCs of an object in a normalized position and size.

Thus a “spectral” interpretation of invariants is possible, e.g. broken cog of a cogwheel (impulse interference) => wideband spectral effect.

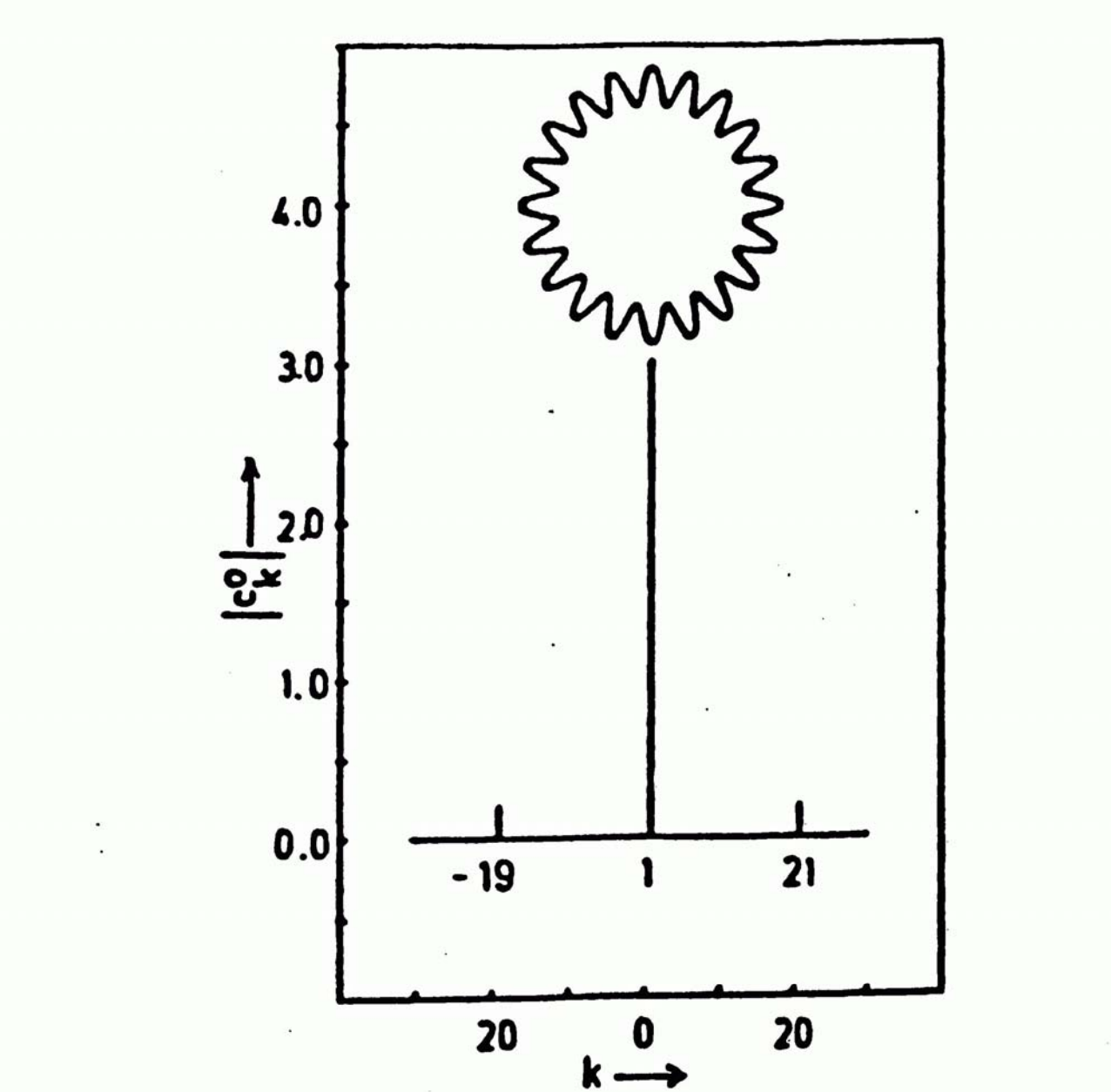
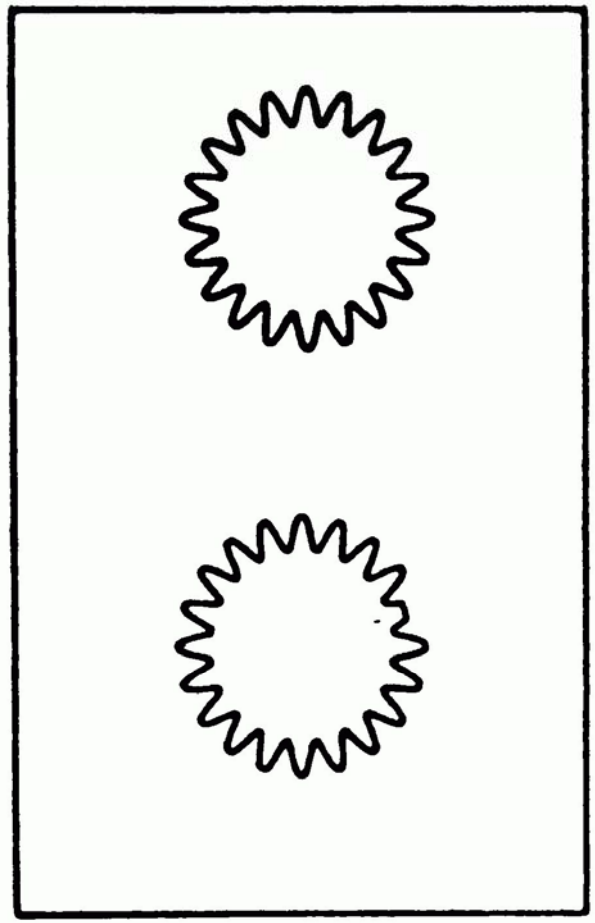
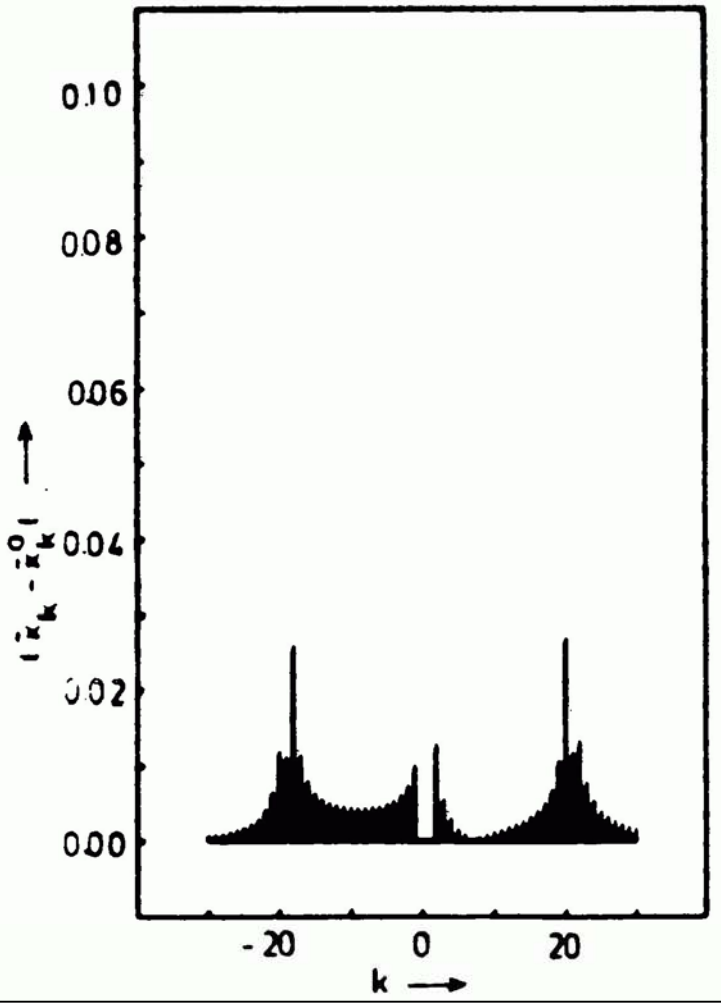


BILD 7: Referenzzahnrad und dessen Amplitudenspektrum

rotation symmetry of degree 20




0.10
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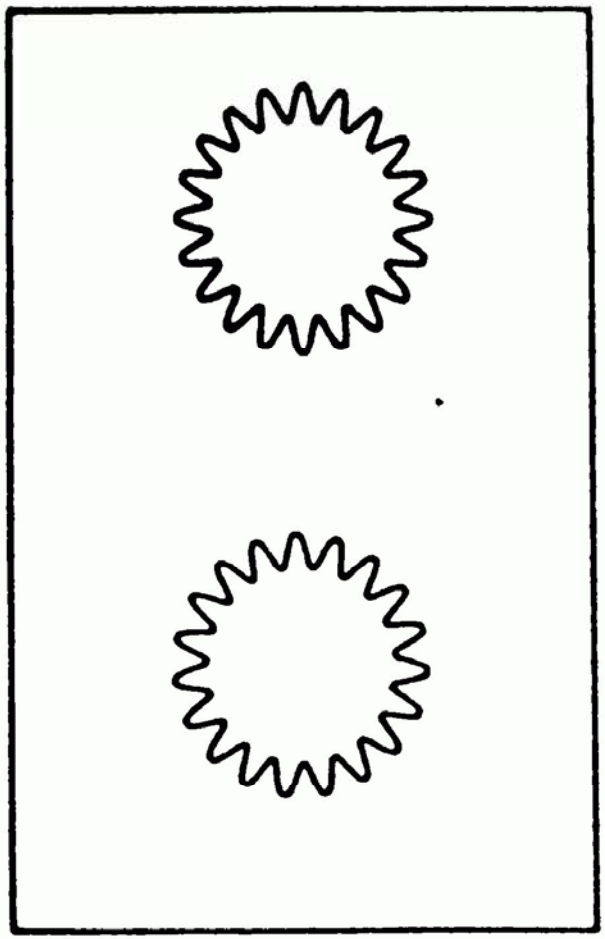

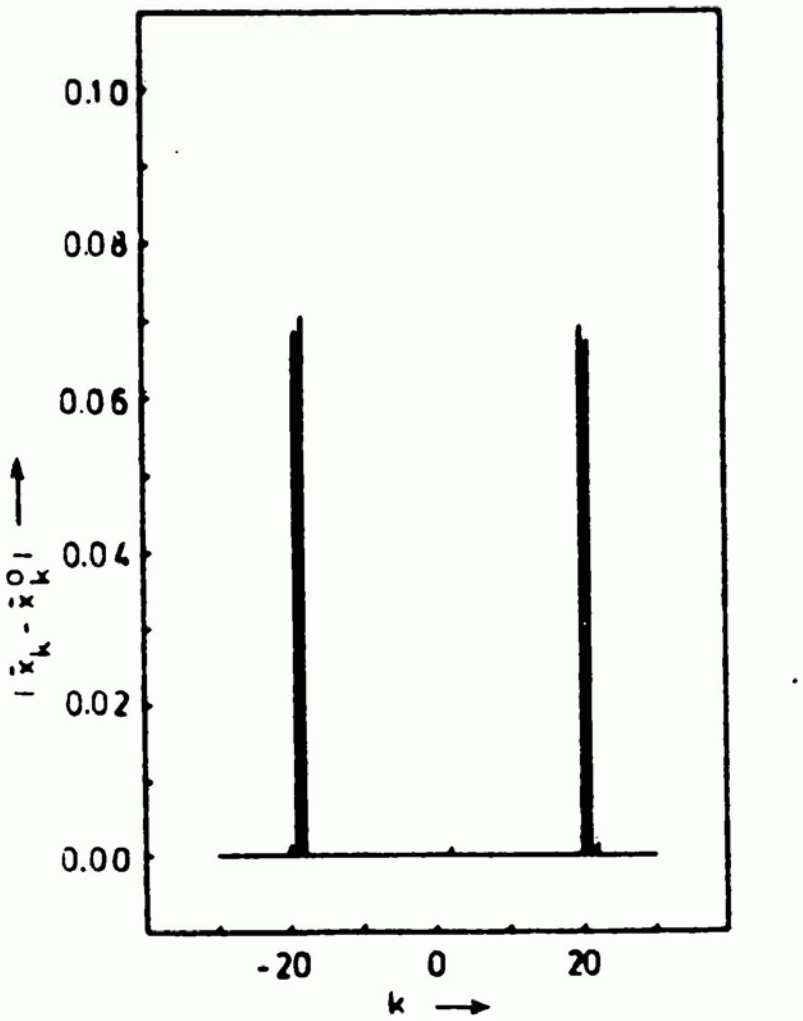
0.10
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Further properties of Fourier descriptors

- FDs are continuous
- Noise interferences can be smoothed
- Linear computational complexity *O(N)* can be retrieved for an approximative, constant number of FDs
- They can be computed with presently used CPUs in video real-time!