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## Retarded potentials and radiation in odd dimensions

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Free massless fields of any spin in flat  $D$ -dimensional spacetime propagate at the speed of light. But the retarded fields produced by the corresponding point-like moving sources share this property only for even  $D$ . Since the Green's functions of the d'Alembert equation are localized on the light cone in even-dimensional spacetime, but not in odd dimensions, extraction of the emitted part of the retarded field in odd  $D$  requires some care. We consider the wave equations for spins 0, 1, and 2 in five-dimensional spacetime and analyze the fall-off conditions for the retarded fields at large distances. It is shown that the farthest part of the field contains a component propagating at the speed of light, while the non-derivative terms propagate with all velocities up to that of light. The generated radiation will contain a radiation tail corresponding to the complete prehistory of the source's motion preceding the retarded moment of time. We also demonstrate that dividing the Green's function into a part localized on the light cone and another part that is not zero inside the light cone gives separately the divergent terms in the Coulomb field of a point source. Their sum, however, is finite and corresponds to the usual power-law behaviour.

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