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Exact solution of Maxwell's equations in inhomogeneous moving media

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The space plasmas investigated by satellites, space probes and ground based networks are inhomogeneous and moving media. The moving velocity space of these plasmas is inhomogeneous also. Therefore, with the increasing accuracy and reliability of the monitoring of these plasmas, of these media, it is very important to derive the exact space-time functions of the electromagnetic (monochromatic or ultra-wide-band) signals propagating in these media by the exact full-wave solution of the Maxwell's equations inside the validity of the theory of special relativity. In this paper the derivation of these solutions is presented.