Two-scale div-curl lemma

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Abstract. The div-curl lemma, one of the basic results of the theory of compensated compactness of Murat and Tartar, does not take over to the case in which the two factors two-scale converge in the sense of Nguetseng. A suitable modification of the differential operators however allows for this extension. The argument follows the lines of a well-known paper of F. Murat of 1978, and uses a two-scale extension of the Fourier transform. This result is also extended to time-dependent functions, and is applied to a two-scale formulation of the Maxwell system of electromagnetism, that accounts for the energy embedded in both coarse- and fine-scale oscillations.