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Dissipative magnetic 2D Zakharov system in bounded domain

We consider the dissipative magnetic Zakharov system in a smooth (2D) bounded domain $\Omega \subset \mathbb{R}^2$ of the form

$$iE_t + \Delta E - nE + iE \times B + i\gamma_1 E = g_1(x,t), \qquad x \in \Omega,$$

$$n_{tt} + \gamma_2 n_t - \Delta\left(n + |E|^2\right) = g_2(x,t), \qquad x \in \Omega,$$

$$B_{tt} - \gamma_3 \Delta B_t + \Delta^2\left(B + iE \times \overline{E}\right) = g_3(x,t), \qquad x \in \Omega,$$

where $n(x,t)$ and $B(t,x) = (0,0,B_3(t,x))$ are the real functions and $E(x,t) = (E_1(t,x), E_2(t,x), 0)$ is a complex one.

If we omit magnetic field B, then the above system is reduced to the dissipative Zakharov system. This system has been studied by many authors (see [1] and references therein).

In the case $\Omega = \mathbb{R}^d$ for $d = 2, 3$ the Cauchy problem for the above system has been considered in [2]. It was obtained local existence and uniqueness results. Our main result is the global well-posedness of the considered problem in some Sobolev type classes and existence of a global attractor.

[1] I. Chueshov and A. Shcherbina, On 2D Zakharov system in a bounded domain, Differential and Integral Equations, 18 (2005), 781-812.

[2] Boling Guo, Jingjun Zhang, Chunxiao Guo. \/, On the Cauchy problem for the magnetic Zakharov system, Monatshefte fur Mathematik, 170 (2013), 89-111.

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