The simplest two-field Q-balls

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Q-balls and their properties are considered in the system of two scalar fields (the complex one and the real one) in (3+1)-dimensions with the simplest possible form of the interaction between fields. A remarkable feature of the model is that it admits analytical treatment for the most part of the analysis. It turns out there exist both stable Q-balls and unstable Q-clouds, which transform to the critical bubbles in the static limit.