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Stabilization of triadic resonance of a finite amplitude gravity wave in the ocean : when a daughter wave is engaged with two fiancés¹ JEAN-MARC CHOMAZ, LadHyX, CNRS-Ecole Polytechnique, SABINE ORTIZ, LadHyX-UME, ENSTA-Paristech, GAETAN LERISSON, LadHyX, CNRS-Ecole Polytechnique — Triadic instability is a very generic mechanism by which a primary wave of finite amplitude is destabilized by two secondary (daugther) waves forming a resonant triad. For gravity wave in the ocean, as shown by Phillips, O.M. (CUP, 1967) the resonant triads form several continuous family that may be represented in two dimension (2D) as resonant lines in the 2D wave vector space of the secondary wave. We show here that the crossing of two od these branches may results in a double triadic instability where the instability is reduced. Building on McEwan, A.D. Plumb, R.A. (Dyn. Atm. Oceans, 1977) we show that this double triadic instability stabilization domain expends from a singular point to a finite significant region when the amplitude of the primary wave is increased. Comparison with direct computation of the instability branches shows that, from very small to order unity primary wave amplitude, the theoretical prediction stay valid and is able to explain the strong departure from the classical triadic instability theory.

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