The double-null map - equilibrium, safety factor on magnetic axis, and perturbation from map parameter DANIEL BARNES, ASIHA BRAXTON-GRAVIN, JADE JENKINS, HALIMA ALI, ALKESH PUNJABI, Hampton University — The double-null map is the simplest symplectic map that has the generic magnetic topology of double-null divertor tokamaks. The generating function of the double-null map is given by $S(x,y) = x^2/2 + y^2/2 - y^4/4$. The equilibrium magnetic surfaces of the double-null map are calculated from the generating function. $0 < S < 1/4$ gives closed surfaces and private flux surfaces; $S = 1/4$ gives the separatrix, and $S > 1/4$ gives open surfaces. The scaling of safety factor on the magnetic axis, q_0, with map parameter k is calculated. The scaling of root mean square deviation of energy on the q_{95} surface with map parameter k is calculated and taken as the estimate of magnetic asymmetry to represent the magnetic perturbation. The results of this work will be reported. These results are used to calculate heteroclinic tangles of the separatrix of double-null map. This work is supported by grants DE-FG02-01ER54624, DE-FG02-04ER54793, and DE-FG02-07ER54937.

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