The linear stability of the relative equilibria in the Coulomb $(n+1)$ body problem

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ABSTRACT

The linear stability of the relative equilibria of the Coulombic $(n+1)$-body problem is studied. The n particles are the electrons having a charge of -1 and the $(n+1)$th particle is the nucleus having a positive charge Z equal to the atomic number. The mass of the nucleus is over three orders of magnitude greater than that of the electrons. Treating the n electrons as identical particles allows the introduction of symmetry variables. This block diagonalizes the Jacobian matrix and consequently factors the characteristic polynomial.