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# Frequency divider

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**Abstract-**

**The paper proposes an approximated yet reliable formula to estimate the frequency at the buses of a transmission system. Such a formula is based on the solution of a steady-state boundary value problem where boundary conditions are given by synchronous machine rotor speeds and is intended for applications in transient stability analysis. The hypotheses and assumptions to define bus frequencies are duly discussed. The rationale behind the proposed frequency divider is first illustrated through a simple 3-bus system. Then the general formulation is duly presented and tested on two real-world networks, namely a 1,479-bus model of the all-island Irish system and a 21,177-bus model of the European transmission system.**

**Index Terms- Center of inertia (COI), dq-frame model, frequency estimation, quasistatic phasor model, transient stability analysis.**



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