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Numerical Calculations of The Total AC Losses of YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub> Coated Conductors with The Ferromagnetic Substrate and Stabilizer DOAN NGUYEN, Center for Advanced Power Systems and Department of Physics, Florida State University, Tallahassee, FL 32306, PAMIDI SASTRY, Center for Advanced Power Systems, Florida State University, Tallahassee, FL 32310, JUSTIN SCHWARTZ, National High Magnetic Field Laboratory and Center for Advanced Power Systems, Florida State University, Tallahassee, FL 32310 — A numerical model is developed to calculate total AC loss of  $YBa_2Cu_3O_{7-\delta}$  coated conductors with a ferromagnetic substrate and Cu stabilizer when carrying a AC transport current in a AC applied background magnetic field. The time evolutions of current and magnetic field distribution along the width of the conductor are calculated by solving Poisson's equation for the vector potential. Apart from the AC loss dissipated in the superconducting layer, the ferromagnetic loss generated by the substrate and eddy current loss dissipated in the Cu stabilizer were also modeled. In the calculations, the superconducting property is assumed to follow power-law characteristics. In general, other practical properties of conductors, including field-dependence of critical current density  $J_c$ , n-value and non-uniform distribution of  $J_c$  can also be accounted for in the numerical calculations. Comparisons between numerical, analytical and experimental results are presented.

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