The design of erbium-doped fiber amplifiers

An accurate model for the erbium-doped fiber amplifier is presented. The model is used to design the index profile of the doped fiber, optimizing with regard to efficiency for inline- and preamplifiers as well as for power booster amplifiers. The predicted pump efficiencies (maximum gain to pump power ratios) are in agreement with experimental results presented in the literature. The choice of codopant is shown to be very significant for the pump efficiency when pumping in the 0.98μm. The pump efficiency in the 0.98-μm pump band is shown to be twice the pump efficiency in the 1.48-μm pump band.