

Abstract:

This thesis is a result of contributions to optimize or improve resource allocation in Passive Optical Networks (PON). The contributions are related with resource allocation during PON operation and with the upgrade process to allocate more capacity to the network in an “as-needed” fashion.

Then we introduce the problem of allocating new capacity to an existing PON through addition of wavelength (channels) and line-rate upgrades. We provide a new cost-based method to optimize the upgrade process in a per-period basis. The results on PON evolution analysis and our capacity-upgrade method contribute to cost reductions while optimizing new channel allocation, maximizing network capacity usage, and assuring minimum disturbances.