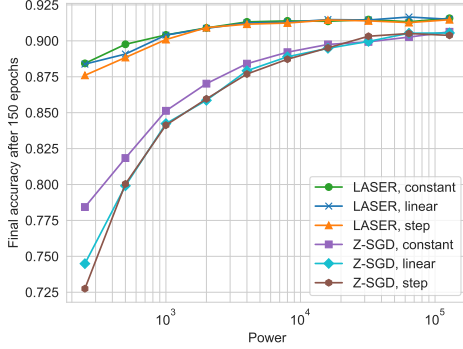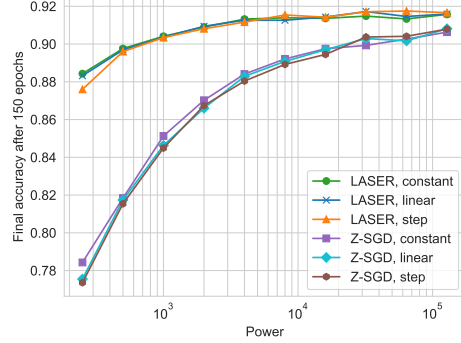## 1 Power control for a fixed budget

(a) Power control increasing allocation with time.

(b) Power control decreasing allocation with time.

Figure 1: Final accuracy vs. power budget P for CIFAR-10 classification with various power control schemes. In **(a)**, for each budget P we monotonically increase the power at epoch t, P_t, between $P/3$ and $5P/3$ with either a linear or a step function. Constant refers to fixing $P_t = P$ as considered in the paper. In **(b)**, we monotonically decrease P_t likewise. We observe that LASER exhibits similar gains over Z-SGD for all the power control laws. Further, constant power remains the best policy for both LASER and Z-SGD. Whilst matching the constant power performance, the power-decreasing control performs better than the increasing counterpart for Z-SGD, especially in the low-power regime, where the accuracy gains are roughly $4 - 5\%$. Similar observation is made in (Amiri et. al. 2019).
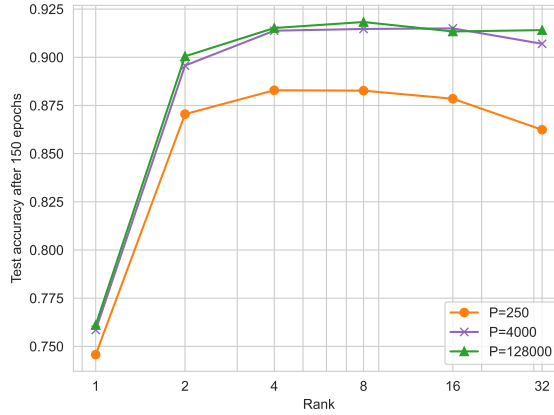
2 Rank-accuracy tradeoff

Figure 2: Final accuracy vs. compression rank tradeoff for CIFAR-10 classification, for low, medium and high power regimes. Rank-4/Rank-8 compression is optimal for all the three regimes. It reveals two interesting insights: (i) performance is uniformly worse in all the regimes with overly aggressive rank-one compression, and (ii) higher rank compression impacts low power regime more significantly than the medium and high-power counterparts. This confirms with the intuition that at low power (and hence noisier channel), it is better to allocate the limited power budget appropriately to few "essential" rank components as opposed to thinning it out over many.