



Figure 1: Computation structure of iteration k of the decentralized distributed ADMM algorithm computed as two message-passing steps in our proposed GNN (see Algorithm ??). The initial node features V^k contain the previous ADMM iterates $(x_i^k, y_i^k, \lambda_i^k)$ for each node i and the non-zero edge features E describe the weighted pairwise connection of nodes in the network which is fixed across iterations. After two message-passing steps – each consisting of a message (**msg**), an aggregation (**agg**), and an update (**upd**) part indicated by a colored box in the figure – the new iterates $(x_i^{k+1}, y_i^{k+1}, \lambda_i^{k+1})$ of all nodes in the network are the output of the GNN.