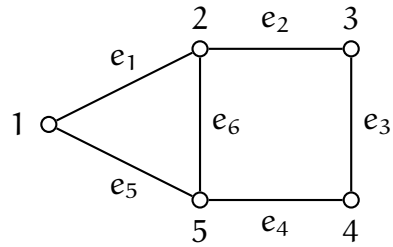


## Math589 Homework 9

1. [1pt] Let  $G$  be the graph with labeled vertices and edges as shown below. Find a sparse basis of the cycle space  $\mathcal{C}(G)$ .



**Solution.**

2. [1pt] Let  $G$  be the graph with labeled vertices and edges as in the previous question. Find a basis of the cut space  $\mathcal{B}(G)$ .

**Solution.**

Questions to ponder:

1. Let  $G$  be the graph as in Page 1. Find a basis of its cycle space that is not sparse.
2. Let  $G = K_{3,3}$ . Find a basis of its cycle space. Is it sparse?
3. Let  $G$  be the hypercube of dimension 3 (the skeleton of a cube). Find all non-separating cycles on  $G$ .
4. Let  $G$  be the (skeleton of) octahedron. Find all non-separating cycles on  $G$ .
5. Practice your  $\text{\TeX}$ nique at <https://texnique.xyz/>.