$$x_{12}^1 - x_{51}^1 = 3$$
$$-x_{12}^1 - x_{42}^1 - x_{52}^1 = -15$$
$$x_{42}^1 - x_{54}^1 = -8$$
$$x_{51}^1 + x_{52}^1 + x_{54}^1 = 20$$

$$x_{12}^2 - x_{41}^2 = 0$$
$$x_{23}^2 - x_{12}^2 = -6$$
$$-x_{23}^2 - x_{43}^2 = -5$$
$$x_{41}^2 + x_{43}^2 - x_{54}^2 = 7$$
$$x_{54}^2 = 4$$

$$x_{12}^3 - x_{41}^3 - x_{51}^3 = -10$$
$$-x_{12}^3 - x_{42}^3 = -10$$
$$-x_{43}^3 = -7$$
$$x_{41}^3 + x_{42}^3 + x_{43}^3 - x_{54}^3 = 9$$
$$x_{51}^3 + x_{54}^3 = 18$$

$$7x_{12}^1 + 4x_{12}^2 + 2x_{12}^3 + 8x_{23}^2 + 9x_{41}^2 + 9x_{41}^3 + 9x_{42}^1 + 4x_{42}^3 + 2x_{43}^2 + 5x_{43}^3 + 9x_{51}^1 + 9x_{51}^3 + 5x_{52}^1 + 9x_{54}^1 + 3x_{54}^2 + 7x_{54}^3 = 556$$

$$6x_{12}^1 + 7x_{12}^2 + 6x_{12}^3 + 3x_{23}^2 + 7x_{41}^2 + 5x_{42}^1 + 2x_{42}^3 + 2x_{43}^3 + 10x_{51}^1 + 7x_{51}^3 + 8x_{52}^1 + 9x_{54}^1 + 5x_{54}^2 + 7x_{54}^3 = 501$$

$$2x_{12}^1 + x_{12}^2 + 5x_{12}^3 + 5x_{23}^2 + 2x_{41}^2 + 6x_{41}^3 + 3x_{42}^1 + 3x_{43}^2 + 2x_{43}^3 + 8x_{51}^1 + x_{51}^3 + 8x_{52}^1 + 2x_{54}^1 + 4x_{54}^2 + 8x_{54}^3 = 307$$

$$x_{54}^1 + x_{54}^3 = 13$$