**Дискретная математика**

Домашнее задание №5

Выполнил: Тахватулин Михаил, P3107

Вариант: 145

Исходная таблица соединений R:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| V/V | e1 | e2 | e3 | e4 | e5 | e6 | e7 | e8 | e9 | e10 | e11 | e12 |
| e1 | 0 | 3 |  | 5 | 5 |  |  | 1 | 2 | 1 |  |  |
| e2 | 3 | 0 | 4 | 5 |  |  | 1 | 1 | 4 | 1 |  | 1 |
| e3 |  | 4 | 0 |  |  | 1 |  | 2 | 3 |  | 1 |  |
| e4 | 5 | 5 |  | 0 |  | 5 | 3 | 1 | 3 |  |  | 2 |
| e5 | 5 |  |  |  | 0 | 2 | 4 |  | 5 |  | 1 |  |
| e6 |  |  | 1 | 5 | 2 | 0 |  | 5 |  | 5 |  |  |
| e7 |  | 1 |  | 3 | 4 |  | 0 |  | 4 |  | 5 |  |
| e8 | 1 | 1 | 2 | 1 |  | 5 |  | 0 |  | 1 | 5 | 2 |
| e9 | 2 | 4 | 3 | 3 | 5 |  | 4 |  | 0 | 2 | 3 | 5 |
| e­10 | 1 | 1 |  |  |  | 5 |  | 1 | 2 | 0 | 1 | 4 |
| e11 |  |  | 1 |  | 1 |  | 5 | 5 | 3 | 1 | 0 |  |
| e12 |  | 1 |  | 2 |  |  |  | 2 | 5 | 4 |  | 0 |

Граф G1:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| V/V | e1 | e2 | e3 | e4 | e5 | e6 | e7 | e8 | e9 | e10 | e11 | e12 |  |  |
| e1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 6 | 6 |
| e2 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 8 | 14 |
| e3 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 5 | 19 |
| e4 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 7 | 26 |
| e5 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 5 | 31 |
| e6 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 5 | 36 |
| e7 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 5 | 41 |
| e8 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 8 | 49 |
| e9 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 9 | 58 |
| e10 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 7 | 65 |
| e11 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 6 | 71 |
| e12 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 5 | 76 |

Граф G2:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| V/V | y1 | y2 | y3 | y4 | y5 | y6 | y7 | y8 | y9 | y10 | y11 | y12 |  |  |
| y1 | 0 | 1 |  | 1 | 1 |  | 1 | 1 |  |  | 1 | 1 | 7 | 7 |
| y2 | 1 | 0 |  |  | 1 |  | 1 |  |  | 1 | 1 |  | 5 | 12 |
| y3 |  |  | 0 |  | 1 |  | 1 | 1 |  |  | 1 | 1 | 5 | 17 |
| y4 | 1 |  |  | 0 | 1 |  | 1 |  | 1 | 1 | 1 |  | 6 | 23 |
| y5 | 1 | 1 | 1 | 1 | 0 | 1 |  |  | 1 | 1 | 1 | 1 | 9 | 32 |
| y6 |  |  |  |  | 1 | 0 |  |  | 1 | 1 | 1 | 1 | 5 | 37 |
| y7 | 1 | 1 | 1 | 1 |  |  | 0 | 1 |  | 1 | 1 | 1 | 8 | 45 |
| y8 | 1 |  | 1 |  |  |  | 1 | 0 | 1 | 1 |  |  | 5 | 50 |
| y9 |  |  |  | 1 | 1 | 1 |  | 1 | 0 |  |  | 1 | 5 | 55 |
| y10 |  | 1 |  | 1 | 1 | 1 | 1 | 1 |  | 0 | 1 |  | 7 | 62 |
| y11 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |  | 1 | 0 |  | 8 | 70 |
| y12 | 1 |  | 1 |  | 1 | 1 | 1 |  | 1 |  |  | 0 | 6 | 76 |

Сумма для графа G1: 76

Сумма для графа G2: 76

Список G1: {6; 8; 5; 7; 5; 5; 5; 8; 9; 7; 6; 5}

Список G2: {7; 5; 5; 6; 9; 5; 8; 5; 5; 7; 8; 6}

Разобьем вершины на классы по степеням:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 9 | 8 | 7 | 6 | 5 |
| e | e9 | e2 e8 | e4 e10 | e1 e11 | e3 e5 e6 e7 e12 |
| y | y5 | y7 y11 | y1 y10 | y4 y12 | y2 y3 y6 y8 y9 |

Из таблицы сразу видно соответствие вершин графов:

|  |  |
| --- | --- |
| e | y |
| e9 | y5 |

Попробуем связать вершины:

|  |  |  |  |
| --- | --- | --- | --- |
| е | | у | |
| е9 | е2 | у7 | у5 |
|  | е8 | у11 |  |

Из таблицы сразу видно соответствие вершин графов:

|  |  |
| --- | --- |
| e | y |
| e9 | y5 |
| е2 | у11 |
| е8 | у7 |

|  |  |  |  |
| --- | --- | --- | --- |
| е | | у | |
| е9 | е4 | у1 | у5 |
| е2 | е10 | у10 | у7 |
| е8 |  |  | у11 |

Из таблицы сразу видно соответствие вершин графов:

|  |  |
| --- | --- |
| e | y |
| e9 | y5 |
| е2 | у11 |
| е8 | у7 |
| е4 | у1 |
| е10 | у10 |

|  |  |  |  |
| --- | --- | --- | --- |
| е | | у | |
| е9 | е1 | у4 | у5 |
| е2 | е11 | у12 | у7 |
| е8 |  |  | у11 |
| е4 |  |  | у1 |
| е10 |  |  | у10 |

Из таблицы сразу видно соответствие вершин графов:

|  |  |
| --- | --- |
| e | y |
| e9 | y5 |
| е2 | у11 |
| е8 | у7 |
| е4 | у1 |
| е10 | у10 |
| е1 | у4 |
| е11 | у12 |

|  |  |  |  |
| --- | --- | --- | --- |
| е | | у | |
| е9 | е3 | у2 | у5 |
| е2 | е5 | у3 | у7 |
| е8 | е6 | у6 | у11 |
| е4 | е7 | у8 | у1 |
| е10 | е12 | у9 | у10 |
| е1 |  |  | у4 |
| е11 |  |  | у12 |

Из таблицы сразу видно соответствие вершин графов:

|  |  |
| --- | --- |
| e | y |
| e9 | y5 |
| е2 | у11 |
| е8 | у7 |
| е4 | у1 |
| е10 | у10 |
| е1 | у4 |
| е11 | у12 |
| е12 | у2 |
| е5 | у9 |
| е6 | у8 |
| е7 | у3 |
| е3 | у6 |

По итоговой таблице связей можно сделать вывод, что каждой вершине графа G1 соответствует одна вершина графа G2, что доказывает изоморфизм данных графов.