

# 1. DRP PAIRING MODEL

$$\begin{aligned} \max \quad & w_1 \sum_{i \in A} \sum_{j \in B} s_{ij} x_{ij} + w_2 \sum_{i \in A^+} \sum_{j \in B^+} x_{ij} \\ & + w_3 \sum_{i \in A} \sum_{j \in B} r_i x_{ij} \end{aligned} \quad (1)$$

$$1 \leq \sum_{i \in A} x_{ij} \leq 2, \quad j \in B \quad (2)$$

$$\sum_{j \in B} x_{ij} \leq 1, \quad i \in A \quad (3)$$

$$\sum_{i \in A_u} \sum_{j \in B} x_{ij} \leq m_u, \quad u \in U \quad (4)$$

$$x_{ij} \leq s_{ij} x_{ij}, \quad i \in A, \quad j \in B \quad (5)$$

$$\sum_{i \in A} \sum_{j \in B} g_i x_{ij} \geq (1 - \epsilon) \sum_{i \in A} \sum_{j \in B} x_{ij} \quad (6)$$

$$r_i x_{ij} \geq r x_{ij}, \quad i \in A, \quad j \in B \quad (7)$$

$x_{ij} \in \{0, 1\}$  assigns mentee  $i$  to mentor  $j$

$A$ : set of mentees

$A_u$ : set of mentees from university  $u$

$A^-, A^+$ : sets of mentees at low and high levels, resp.

$B$ : set of mentors

$B^-, B^+$ : sets of mentors at low and high levels, resp.

$C$ : set of study areas

$U$ : set of universities

$w_1, w_2, w_3$ : weights

$m_u$ : max # of assigned mentees from university  $u$ .

$g_i \in \{0, 1\}$ : gender of mentee  $i$ . women = 1.

$\epsilon \in [0, 1]$ : parameter for gender equity

$r_i$ : reference score of mentee  $i$ . Input.

$r$ : min reference score requirement. Input.

$s_{ij}$ : matching score of mentee  $i$  with mentor  $j$ . Input.

$s_{ij} = 0 \iff i, j$  do not share a common interest.

$s_{ij} = \sum_{t \leq 3} \sum_{k \leq 3} a_{tk} \iff t$ .th interest of  $i$  and  $k$ .th interest of  $j$  are the same.  $a_{tk}$ 's are pre-defined values.

## Constraints

- (1) maximizes sum of matching scores.
- (2) each mentor receives one or two mentees.
- (3) each mentee is assigned to at most one mentor.
- (4) at most  $m_u$  mentees are assigned from uni  $u$ .
- (5)  $i$  is assigned to  $j$  only if their interests intersect.
- (6) controls the rate of women mentees by  $\epsilon$
- (7) eliminates mentees with ref score below  $r$

## Notes

1. The second term in (1) prioritizes implicitly the assignment of mentees of high levels besides the matching of mentees of high levels and mentors.

2. "Bogazici maximum ogrenci sayisini belirlerken calisma alanlari da onemli. Ornek: Bogazici'ni esledikten sonra geriye topoloji calisabilecegimiz mentorler kalsin." **Bunun icin bir constraint tasarlamadik ama model implicitly hallediyor.**