## Supplementary material: Sample data for synthetic data experiment

The supplementary material shows one of the 10 datasets with datasize = 5000, clustered objectives and dispersed resources. The explanation of experiment settings for various experiment groups can be found in Table 4 of the main manuscript.

Out of the dataset in a zip file, the file raw\_coordinates.csv contains the raw coordinates of spatial points. The file contains six columns: objective\_x, objective\_y, resource1\_x, resource1\_y, resource2\_x and resource2\_y, for the (x, y) coordinates of 5000 objective, resource1 and resource2 points, respectively. Part of the data is shown in Figure Supp1.



Figure Supp1. Plot of part of dataset, with (x, y) = (0, 0) in the lower-left.

The other six files contain the complete data for experiment groups with different combinations of extraneous factors (0, 10%, 20%) and 'true' membership functions for

near1/near2 with respect to their raw values (linear, Gaussian-curve). Attributes in each of

the six files are listed in Table Supp1.

Column	Attribute name	Description
1–4	<pre>acc_res1_near_C, acc_res1_far_C, acc_res2_near_C, acc_res2_far_C</pre>	$\mu_{\rm Y}$ (near1), $\mu_{\rm Y}$ (near1), $\mu_{\rm N}$ (near2) and $\mu_{\rm N}$ (near2), for experiment
5–8	acc_res1_near_G, acc_res1_far_G, acc_res2_near_G, acc_res2_far_G	group with 'perceived' memberships = crisp ( $C_0$ and 1 values only)
9–12	acc_res1_near_L, acc_res1_far_L, acc_res2_near_L, acc_res2_far_L	Gaussian-curve (G), and linear (L)
13–16 17–26 27–42	other1_0 ~ other1_3 other2_0 ~ other2_9 noise1_0 ~ noise1_3, noise2_0 ~ noise2_3, noise3_0 ~ noise3_3, noise4_0 ~ noise4_3	Expressing categorical attribute values; same values for group with any 'perceived' memberships; e.g. for an objective, if other1=0, then other1_0=1 and other1_0 ~ other1_3=0
43–44 45–46 47–48	outcome_good_C, outcome_bad_C outcome_good_G, outcome_bad_G outcome_good_L, outcome_bad_L	$\mu_{good}$ (outcome) and $\mu_{bad}$ (outcome) for experiment group with 'perceived' memberships = crisp, Gaussian-curve, and linear

Table Supp1. Attributes in complete data files.

Users need to select the corresponding complete data file and columns to run different experiment groups. For example, to run the group with 10% extraneous factors, Gaussian-curve 'true' membership functions, and linear 'perceived' memberships for evaluating RIMs, use columns 9–12, 13–42 and 47–48 in data\_realGaus\_exfactor10.csv.