Diet Optimization

This application finds the least-cost diet that fulfills a specific set of nutritional requirements It has a default basket of foods (with an associated set of nutritional data), but foods can be added or removed, with changes remembered from prior saved sessions.

Stigler studied this problem heuristically in the 1940s, but only the development of modern optimization algorithms gave relatively quick accurate solutions. The linear programming techniques implemented in this application are now widely used to create practical diet plans from accepted nutritional guidelines.

STEP 1: Add, Modify or Remove Foods

If you want to add a custom food, then specificy its name, nutritional contents and cost, and click "Add or Update". Any non-positive numbers will be ignored. You can get nutritional data from http://www.nutritiondata.com.

Select Food: [Donut ▾]   [Add or Update]   [Reset Foods to...]

[Remove]

Name	Serving Size	Calories /kCal	Fat /g	Current List of Foods
Donut	60g	239	11	Chicken, roa... Blueberries, Spinach,boile Banana, raw Milk 1%, add

Saturated Fat /g	Trans Fat /g	Cholesterol /mg	Sodium /mg
3	0	18	232

Carbs /g	Fibre /g	Sugar /g	Protein /g	Cost /$
30	1	12	4	.85

Vitamin A /IU	Vitamin C /mg	Calcium /mg	Iron /mg	Limit to whole portions?

13.8		.7		27.6		2.2		☐

STEP 2: Nutritional Constraints in Optimized Diet

Leave blank for no specific lower or upper bound.

	Greater Than	Less Than		Greater Than	Less Than
Calories /kCal	1900	2200	**Fibre /g**	20	60
Fat /g	30	75	**Sugar /g**		50
Saturated Fat /g		25	**Protein /g**	50	160
Trans Fat /g		2	**Vitamin A /IU**	3000	7000
Cholesterol /mg		300	**Vitamin C /mg**	300	
Sodium /mg	1500	2300	**Calcium /mf**	1000	
Carbohydrates /mg	50	300	**Iron /mg**	18	40

STEP 3: Optimum Least-Cost Diet

Click "Optimize Diet!".

[Optimize Diet!]

Food Portions in Optimized Diet   **Optimum Cost and Nutrition Data**

$$
\begin{bmatrix}
\text{"Donut"} & 0. \\
\text{"Bagel, Oat Bran"} & 3.0 \\
\text{"Yogurt,fruit,non fat"} & 0. \\
\text{"Chili"} & 0. \\
\text{"Brocolli,boiled,no salt"} & 1.0 \\
\text{"Apple"} & 0. \\
\text{"Oats,instant,dry"} & 2.0 \\
\text{"Orange,raw,navel"} & 1.0 \\
\text{"Lentils,cooked,no salt"} & 3.5 \\
\text{"Carrots, baby raw"} & 0. \\
\text{"Brussel sprout, cooked"} & 2.4 \\
\text{"Chicken, roast, no skin"} & 2.1 \\
\text{"Blueberries, raw"} & 0. \\
\text{"Spinach,boiled, no salt"} & 0. \\
\text{"Banana, raw"} & 0. \\
\text{"Milk 1\%, added vit A"} & 1.8
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{"Cost"} & \text{"\$ 10.65"} \\
\text{"Calories"} & \text{"1900.0 kCal"} \\
\text{"Fat"} & \text{"30.0 g"} \\
\text{"Saturated Fat"} & \text{"9.7 g"} \\
\text{"Trans Fat"} & \text{"0. g"} \\
\text{"Cholesterol"} & \text{"237.1 mg"} \\
\text{"Sodium"} & \text{"1519.4 mg"} \\
\text{"Carbohydrates"} & \text{"263.9 g"} \\
\text{"Fibre"} & \text{"53.1 g"} \\
\text{"Sugar"} & \text{"50.0 g"} \\
\text{"Protein"} & \text{"152.6 g"} \\
\text{"Vitamin A"} & \text{"7000.0 IU"} \\
\text{"Vitamin C"} & \text{"300.0 mg"} \\
\text{"Calcium"} & \text{"1000.0 mg"} \\
\text{"Iron"} & \text{"40.0 mg"}
\end{bmatrix}
$$