The Agreement Plot arranges the survey questions on the **2-simplex**, which is the triangle connecting the points $(1,0,0)$, $(0,1,0)$, and $(0,0,1)$ in 3-space and its interior. Their positions are encoded as **homogeneous coordinates**: The numbers of panelists who agree with, disagree with, and are uncertain about each question form a triple (a,d,u), possibly weighted by strength of (dis)agreement or confidence. These coordinates determine a line through the origin (which would be the same line if the coordinates were scaled together). Since the coordinates are all nonnegative, the line passes through the 2-simplex; this intersection locates the question in the plot. (This scheme is adapted from correspondence analysis, and the layout is called a ternary plot.)

For each panelist $i = 1, \ldots, N$ and each question $j = 1, \ldots, M$, encode i's response to j as strong agreement ($r_{ij} = +1 + \sigma$), agreement ($r_{ij} = +1$), uncertainty ($r_{ij} = 0$), disagreement ($r_{ij} = -1$), or strong disagreement ($r_{ij} = -1-\sigma$), where $\sigma \in [0,1]$ is a tuning parameter controlled by the user. (r_{ij} is not defined if i left no opinion on j.) The panelists also recorded their confidence $C_{ij} \in [1,10]$ in their answers. We stratify these values by response strength and center them by their logits. Explicitly, we first logit-transform the values C_{ij} to

$$C'_{ij} = \log(C_{ij}/(11 - C_{ij})),$$

subtract from each value the mean m_s conditional on each response strength s (uncertain, (dis)agree, and strongly (dis)agree) to get

$$C''_{ij} = C'_{ij} - m_s,$$

then apply the inverse-logit

$$C'''_{ij} = 11 \times \exp(C''_{ij})/(1 + \exp(C'''_{ij})).$$

We then calculate *confidence weights* $c_{ij} = 1 + \gamma C'''_{ij}$, where $\gamma \in [0,1]$ is a tuning parameter, also controlled by the user.

The *agreement* on question j is $a(j) = \sum_{r_{ij}>0} c_{ij} r_{ij}$, the sum of the agreeing responses, weighted by both confidence and strength of agreement; the *disagreement* $d(j)$ is defined analogously. The *uncertainty* is $u(j) = \sum_{r_{ij}=0} c_{ij}$, the weighted sum of the uncertain responses. The standardized coordinates $(a(j), d(j), u(j))/(d(j) + a(j) + u(j))$ are then projected to two dimensions via linear transformations:

$$\begin{aligned} x(j) &= (\sqrt{3}/2) \times u(j) - 1/2\sqrt{3} \\ y(j) &= (1/2) \times a(j) - (1/2) \times d(j) \end{aligned}$$