

The background of the slide is a complex, abstract composition. It features a network of thin, light-colored lines forming a web-like structure. Overlaid on this are various data points and patterns. In the upper left, there are small, colorful dots (green, blue, orange) and a grid of small '+' symbols. In the lower left, there is a larger, more detailed pattern of dots and lines, possibly representing a graph or a spatial distribution. The overall color palette is muted, with shades of brown, grey, and white, accented by the colors of the data points.

Session 3. Constrained Mining with Pattern Anti-Monotonicity

Pattern Space Pruning with Pattern Anti-Monotonicity

- Constraint c is *anti-monotone*
 - If an itemset S **violates** constraint c , so does any of its superset
 - That is, mining on itemset S can be terminated
- Ex. 1: $c_1: \text{sum}(S.\text{price}) \leq v$ is **anti-monotone**
- Ex. 2: $c_2: \text{range}(S.\text{profit}) \leq 15$ is **anti-monotone**
 - Itemset ab violates c_2 ($\text{range}(ab) = 40$)
 - So does every superset of ab
- Ex. 3. $c_3: \text{sum}(S.\text{Price}) \geq v$ is **not anti-monotone**
- Ex. 4. Is $c_4: \text{support}(S) \geq \sigma$ anti-monotone?
 - Yes! Apriori pruning is essentially pruning with an anti-monotonic constraint!

TID	Transaction	Item	Profit
10	a, b, c, d, f, h	a	40
20	b, c, d, f, g, h	b	0
30	b, c, d, f, g	c	-20
40	a, c, e, f, g	d	-15
		e	-30
		f	-10
		g	20
		h	-5

min_sup = 2

price(item) > 0