**in-items** – rated by users

**cold-items** – not rated by any user

– where is the number of correct items that appear in Top-M recommendation for user u, is the number items that user u had rated positive.

– where is the number of correct items that appear in Top-M recommendation for user u, is the Top-M number.

**in-matrix prediction** – all items are in-items

**out-of-matrix predicition** – items are both in-items and cold-items