

Illustrative Settings for the TNG Lab GUI Parameter Values

```
Generations = 50           // Total number of generations.
Trade Cycles = 150        // Total number of trade cycles per generation.
Seed = 19                 // Initial seed for pseudo-random number generator.
MutationRate = .005       // GA mutation rate (bit toggle probability).

Initial Expected = +1.4   // Initial expected utility assigned to potential partners.
Refusal = -0.5           // Non-positive payoff received (i.e., transaction cost paid)
                        // by a buyer or dealer whose offer to buy is refused.
Inactive = +0.0          // Payoff received by an inactive agent.
Experience Gain = +0.0    // Degree to which past partner experiences
                        // are recalled from one generation to the next
                        // (0 = no recall; 1 = complete recall).
BothCoop = +1.4          // Mutual cooperation trade payoff.
BothDefect = -0.6        // Mutual defection trade payoff.
Temptation = +3.4        // Highest possible trade payoff.
Sucker = -1.6            // Lowest possible trade payoff.

FSM States = 16          // Number of internal finite state machine states.
FSM Memory = 1           // Finite state machine memory (in bits) for past move recall.

Buyer = 12               // Total number of pure buyers.
Seller = 6               // Total number of pure sellers.
Dealer = 5               // Total number of dealers (buyer-sellers).
% Elite (Buyer)= 0.67    // GA elite percentage for buyers.
% Elite (Seller) = 0.50  // GA elite percentage for sellers.
% Elite (Dealer) = 0.60 // GA elite percentage for dealers.
Buyer Quota = 1         // Bid (offer to buy) quota for buyers and dealers.
Seller Quota = 2        // Bid acceptance quota for sellers and dealers.
```

Admissible Settings for the TNG Lab GUI Parameter Values

Important Notes:

Hardware-specific memory limitations will impose further practical restrictions on the admissible settings indicated below for “FSM States”, “Buyer”, “Seller”, and “Dealer.” If these parameter values are set “too large” relative to memory, you will either slow down, freeze, or crash the experimental run. If this happens, close down the TNG Lab (or reboot

your machine by pressing control-Alt-Del) and start over with smaller parameter values. I recommend keeping the total number of traders fairly small (say around 30 or less) for your initial experimental runs, and the number of FSM states to 20 or less. FSM=20 corresponds to a really huge (although still finite) number of possible trade strategies that can be represented by each finite state machine.

“Generations” controls the number of times genetic algorithms (GAs) are separately implemented to update the current populations of buyer strategies, seller strategies, and dealer strategies. “Trade Cycles” controls the number of trade cycles implemented between GA implementations. “Trade Cycles,” the number of traders of each type, and the quota value of each trader type, together determine the sampling rate, i.e. the degree to which traders have an opportunity to learn about other traders’ strategies through trade interactions between GA implementations. If either “Generations” or the sampling rate is set too small, the result can be incomplete learning and a failure to settle into any persistent interaction patterns over the course of experimental runs.

- “Generations” and “Trade Cycles” can be ANY POSITIVE INTEGERS.
- “Seed” can be ANY UNSIGNED INTEGER.
- “Mutation Rate” can be ANY NONNEGATIVE NUMBER LESS THAN 1.
- “Initial Expected”, “Inactive”, “Both Coop”, “Both Defect”, “Temptation”, and “Sucker” can be ANY REAL NUMBERS.
- “Refusal” can be ANY NON-POSITIVE NUMBER.
- “Experience Gain” can be ANY NUMBER BETWEEN 0 AND 1 INCLUSIVE.
- “FSM States” can be ANY POSITIVE INTEGER.
- “FSM Memory” can be ANY POSITIVE INTEGER NOT EXCEEDING 32.
- “Buyer” and “Seller” and “Dealer” can be ANY NON-NEGATIVE INTEGERS.
- “Buyer Quota” can be ANY POSITIVE INTEGER NOT EXCEEDING “SELLER” (THE TOTAL NUMBER OF SELLERS).
- “Seller Quota” can be ANY POSITIVE INTEGER.
- The three “% Elite” settings can be ANY NUMBERS BETWEEN 0 AND 1 INCLUSIVE AND CAN DIFFER FROM EACH OTHER.