Errata to paper [1]

- Equation (5) should be changed from

$$\forall A \in E,\ v \in V,\ x_v \in X_v\colon\ (A, \{v\}, x_v) \in J$$

  to

$$\forall A \in E,\ v \in A,\ A \neq \{v\},\ x_v \in X_v\colon\ (A, \{v\}, x_v) \in J$$

- Equation (22) should read

$$\max_{x_{V \setminus \{v\}}} \theta_V^{\boldsymbol{\varphi}}(x_V) = \max_{x_{V \setminus \{v\}}} \left[\theta_V(x_V) + \sum_{u \in V} \varphi_{V,u}(x_u) \right]$$

  Similarly, the previous equation should read

$$\max_{x_{V \setminus A}} \left[\theta_V(x_V) + \sum_{v \in V} \varphi_{V,v}(x_v) + \sum_{vv' \in E} \varphi_{V,vv'}(x_v, x_{v'}) \right]$$

- Four lines under equation (23), the expression

$$\{\, \varphi_{V,v} - \max_{x \neq \bar{x}} \varphi_{V,v}(\bar{x}) \mid v \in V \,\}$$

  should be replaced with

$$\{\, \varphi_{V,v}(\bar{x}) - \max_{x \neq \bar{x}} \varphi_{V,v}(x) \mid v \in V \,\}$$

- I said that a CSP $\boldsymbol{\sigma}$ satisfying Equation (12) is *arc consistent*. This is not entirely precise, it is actually as follows. (Generalised) arc consistency occurs in the special case when $J \subset I(E)$ satisfies Equation (5). If $J = I(E)$, $\boldsymbol{\sigma}$ is *pairswise consistent* [1]. If $J \subset I(E)$ is general, we get a form of local consistency that does not have a name.

- Theorem 2 contains a mistake because I did not realize that an equivalent transformation preserves supermodularity only if it is done on a pair $(A, \{v\})$ with $v \in A$ (i.e., hyperedge-singleton). Therefore, the condition of the theorem should be that J contains the elements defined by (5) but *no more* elements. Nevertheless, I strongly believe that the theorem holds true even in the current state.

  This mistake has been fixed in a later version [2] of the paper, see footnote 8 therein.

References

[1] Tomáš Werner. High-arity interactions, polyhedral relaxations, and cutting plane algorithm for soft constraint optimisation (MAP-MRF). In *Computer Vision and Pattern Recognition Conf., Anchorage, USA*, June 2008.

[2] Tomáš Werner. Revisiting the linear programming relaxation approach to Gibbs energy minimization and weighted constraint satisfaction. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 32(8):1474–1488, August 2010.