



# Correction to: A heuristic-based non-linear mixed integer approach for optimizing modularity and integrability in a sustainable reconfigurable manufacturing environment

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Published online: 2 June 2020

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## Correction to: The International Journal of Advanced Manufacturing Technology

<https://doi.org/10.1007/s00170-020-05366-y>

This original article contained a mistake.

**C1:** The notation table in page 12 is not copied correctly. The correct notations are as follows:

### Indices

Operations	$o, o' = 1, \dots, TNOP$
Configurations	$c, c' = 1, \dots, NC$
Machines	$m, m' = 1, \dots, NM$
Basic modules	$\gamma = 1, \dots, BM$
Auxiliary modules	$\delta = 1, \dots, AM$

### Parameters

$TNOP$	Total number of operations
$NC$	Total number of configurations
$NM$	Total number of machines
$BM$	Number of basic modules
$AM$	Number of auxiliary modules
$SMAC$	Set of available machines
$SCN$	Set of configurations
$NI_{m,c}$	Number of interfaces
$PRM_o$	Precedence Matrix

The online version of the original article can be found at <https://doi.org/10.1007/s00170-020-05366-y>

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$E_{PLC}^{m,\gamma}$	Energy consumption by controller PLC of $\gamma^{\text{th}}$ basic module on the $m^{\text{th}}$ machine
$E_{PLC}^{c,\delta}$	Energy consumption by controller PLC of $\delta^{\text{th}}$ auxiliary module for the $c^{\text{th}}$ configuration
$E_{WASTE}$	Energy waste between interfaces
$E_{CHANGE}^{m,m'}$	Energy changing machines
$E_{ASS}^{c,\delta}$	Energy consumption by assembling $\delta^{\text{th}}$ auxiliary module for the $c^{\text{th}}$ configuration
$E_{DIS}^{c,\delta}$	Energy consumption by disassembling $\delta^{\text{th}}$ auxiliary module for the $c^{\text{th}}$ configuration
$E^{m,\gamma}$	Energy consumption by $\gamma^{\text{th}}$ basic module on $m^{\text{th}}$ machine

### Decision variables

$w_o^{m,c}$	1 if the $o^{\text{th}}$ operation is being processed by the $m^{\text{th}}$ machine using $c^{\text{th}}$ configuration, 0 otherwise
$x_{o,\gamma}^{m,c}$	1 if the $m^{\text{th}}$ machine is using the $\gamma^{\text{th}}$ basic module in $c^{\text{th}}$ configuration for the $o^{\text{th}}$ operation, 0 otherwise
$y_o^{m,m'}$	1 if there has been a change between machine $m$ and $m'$ in the $o^{\text{th}}$ operation, 0 otherwise
$u_{o,\delta}^{m,c}$	1 if the $m^{\text{th}}$ machine is using the $\delta^{\text{th}}$ auxiliary module in $c^{\text{th}}$ configuration in the $o^{\text{th}}$ operation, 0 otherwise
$z_{o,\delta}^{m,c}$	1 if the $\delta^{\text{th}}$ auxiliary module is assembled on the $m^{\text{th}}$ machine in $c^{\text{th}}$ configuration in the $o^{\text{th}}$ operation, 0 otherwise
$v_{o,\delta}^{m,c}$	1 if the $\delta^{\text{th}}$ auxiliary module is disassembled on the $m^{\text{th}}$ machine in $c^{\text{th}}$ configuration in the $o^{\text{th}}$ operation, 0 otherwise

C2: Fig5 in page 19 can be replaced by the following figure.

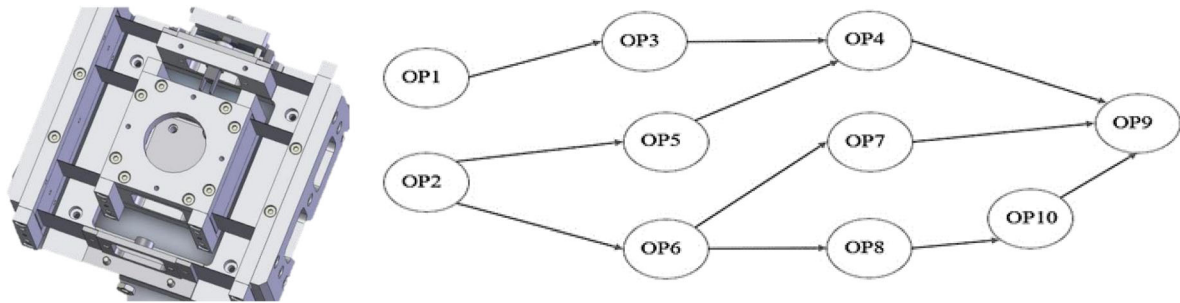


Fig. 5 Scenarios 3 and 4—product vs operation precedence graph

The original article has been corrected.