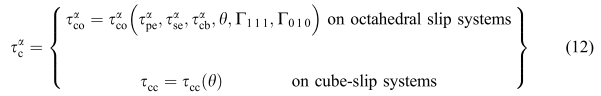
I am attempting to find , in Equation 12 of [1].



The Symbols are as follows

|  |  |
| --- | --- |
| Symbol | Definition |
|  | Normal of the slip plane of the primary slip system (Also used for Schmid type crystal plasticity) |
|  | Slip direction (in the direction of the burger’s vector) of the primary slip system (Also used for Schmid type crystal plasticity) |
|  | Slip direction (in the direction of the edge component of the burger’s vector) of the primary slip system |
|  | Normal of the slip plane of the Secondary slip system |
|  | Normal of the slip plane of the Cubic slip systems |

|  |  |
| --- | --- |
|  | Eq. 1 |
|  | Eq. 2 |
|  | Eq. 3 |
|  | Eq. 4 |

Where represents the resolved shear stress, is the slip system, is the stress, and   denote the unit vector.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Slip type |  |  |  | Cross product |  |  |
| FCC | 1 | (1 1 1) | [0 1] | [2 ] | ( 1 1) | (1 0 0) |
| 2 | (1 1 1) | [1 0 ] | [] | (1 1) | (0 1 0) |
| 3 | (1 1 1) | [] | [] | (1 1 ) | (0 0 1) |
| 4 | ( 1 1) | [1 0 1] | [1 2 ] | ( 1) | (0 1 0) |
| 5 | ( 1 1) | [ | [] | ( 1 ) | (0 0 ) |
| 6 | ( 1 1) | [0 | [2 1 1] | ( 1 1) | (1 0 0) |
| 7 | (1 1) | [0 1 1] | [] | ( 1) | ( 0 0) |
| 8 | (1 1) | [1 1 0] | [ 1 2] | (1 ) | (0 0 1) |
| 9 | (1 1) | [1 0 ] | [1 2 1] | (1 1) | (0 1 0) |
| 10 | (1 1 ) | [0 1 1] | [2 1] | ( 1 ) | (1 0 0) |
| 11 | (1 1 ) | [1 0 1] | [1 2 ] | (1 ) | (0 0) |
| 12 | (1 1 ) | [] | [1 1 2] | (1 1 ) | (0 0 1) |
| Cubic | 13 | (1 0 0) | [0 1 1] | Not needed as is only depends on temperature | | |
| 14 | (1 0 0) | [0 1 ] |
| 15 | (0 1 0) | [1 0 1] |
| 16 | (0 1 0) | [1 0 ] |
| 17 | (0 0 1) | [1 1 0] |
| 18 | (0 0 1) | [1  0] |

**References**

[1] Keshavarz S, Ghosh S (2015) A crystal plasticity finite element model for flow stress anomalies in Ni 3 Al single crystals. Philos Mag 95:1–22

[2] Ghosh S, Weber G, Keshavarz S (2016) Multiscale modeling of polycrystalline nickel-based superalloys accounting for subgrain microstructures. Mech Res Commun 78:34–46

[3] Keshavarz S, Ghosh S (2013) Multi-scale crystal plasticity finite element model approach to modeling nickel-based superalloys. Acta Mater 61:6549–6561

[4] Paidar V, Pope DP, Vitek V (1984) A theory of the anomalous yield behavior in L12ordered alloys. Acta Metall 32:435–448