% Example : tire_example_camber.lut. Lut input is angle in degrees and output is grip in percent. Example LUT format :

-1|1.04
0|1
1|0.975

DCAMBER_LUT_SMOOTH=1 ; Toggles smoothing for DCAMBER_LUT on or off, with 0 being off and 1 being on.

% extended
DX_CAMBER_REF=3 ; reference angle (in degrees) - must not be zero
DX_CAMBER_MULT=0.98 ; grip multiplier at reference angle

COMBINED_FACTOR=2.20
COMBINED_FACTOR_1=0.4

% ▲ Controls the combined lateral + longitudinal slip grip gain. Modern tires have been observed to not lose lateral grip when some longitudinal stress is applied. A value of 2.0 is standard ie: traction "circle", while values above 2.0 will square it out, providing more grip in combined situations. Real tires appear to have somewhat high values, perhaps around 2.1 to 2.3, but this information is subject to change. It is possibly down to individual tire characteristics.

FLEX_GAIN=0.122 ; Parameter that influences the amount of flex of the tyre.

The formula are proprietary (KS) and will not be published however the value will roughly approximate a "widening" of the value at which the tyre reaches max grip as function of load.
The parameter express the amount of slip added to the reference slip angle when load is twice FZ0. Example.
Let's say a tyre has a FRICTION_LIMIT_ANGLE of 10 deg, FZo=2000 N, and a FLEX_GAIN of 0.5 then the max slip angle will be: 10 deg @ 2000N 10 * (1 + 0.5) = 15 deg @ 4000N
Bigger flex = the lateral force peaks at higher slip angles at increased loads. Values at a few loads are exposed in AC log.txt"

% parameter in the contact patch flex equations. It cannot be compared to real-world values as the interactivity is high within the tire model. It is additive to the slip angle. The author is unaware of the specific formula(s) used by the engine. An approximation would be that FLEX_GAIN gets added to FRICTION_LIMIT_ANGLE when load is 2*FZ0, however this is not completely truthful. The log outputs relevant information for determining the practical effects. The effect appears to be somewhat linear. Typical values for radial tires appear to be around 0.0500 to 0.1200. Most radial tires perhaps end up around 0.0700 to 0.1000. KS values are somewhat non-compliant compared to current understanding.

FALLOFF_LEVEL=0.90 ; Lowest grip limit past grip peak (related to peak, so 0.9 is 90% of max grip).

% ▲ Recommended to use around 0.7-0.8 for most tires. Input is in percent, so 80% = 0.8.

% Adjusts the grip the tire will produce when slipping at infinite SR (slip ratio). In vanilla, falloff curve is shared between lateral and longitudinal, while in real tires lateral dropoff is much lower than longitudinal.

FALLOFF_SPEED=1 ; The speed of grip drop-off after reaching the peak slip angle.

% ▲ In other words, it can be seen as how much time the tire takes to come to falloff level. It is a sort of gamma that defines the curve from the peak (=1) to the FALLOFF_LEVEL (=0.9 for example); =2 was the standard till v6 tyres, =1 is linear so the tyre is "easier", higher numbers make the transition sharper. In conjunction with the value of 0.7-0.8 for FALLOFF_LEVEL, values of 1-3 for FALLOFF_SPEED are recommended.

CX_MULT=0.976 ; It controls the cornering stiffness of the longitudinal part of the tyre force generation.

% ▲ Adjusts the optimal slipratio longitudinally. A value lower than 1.0 will make the longitudinal part less aggressive, a value of 1.0 will make it exactly like the lateral, and higher than 1.0 values will make it stiffer. Values below 1.0 are not typically recommended because tires are typically stiffer longitudinally than laterally. While this is interesting, the most important effect of this value is in the way longitudinal and lateral forces are combined into a resultant force. Sadly data on combined forces is pretty rare so there isn't a "correct value" to suggest here.

Lower values of CX_MULT will create a tyre that feels more responsive to throttle/brake application. In other words, there will be more loss in lateral friction when longitudinal friction is applied. Higher values will do the exact opposite by creating a tyre that is pointier and more composed. It's a parameter that really has huge effects on the final car behaviour.

The formula for the longitudinal slipratio is:

Vanilla: tan(slip angle opt) / CX MULT
Cphys: sin(slip_angle_opt) / CX_MULT

RADIUS_ANGULAR_K=0.082 ; This is the tyre radius increase as function of rotation speed.

It is a simple linear relationship where the dynamic tyre radius is: dynamic_radius = radius + (RADIUS_ANGULAR_K * abs(tyre_rotation) / 1000) Here RADIUS_ANGULAR_K is in mm/rad/s and tyre rotation is rad/s, hence the division to convert to meters for the radius. Typical values for racing tires are around 0.01

% is an input in the formula for tire radius growth in millimeters from angular speed. Formula: RADIUS_ANGULAR_K * angularVelocity in rad/s.

BRAKE_DX_MOD=0 ; % additive to longitudinal grip under braking. It's a DX multiplier apparently (1 + BRAKE_DX_MOD).

Positive values will make the tyres better on braking than accelerations, and the opposite is true ... but usually tyres generate more slip on acceleration than braking so using positive value is the way to go."
% controls how much more longitudinal grip the tire has in braking compared to acceleration. Formula is (1+BRAKE_DX_MOD)*D. For example, a value of 0.02 will provide +2% D when braking, and a value of -0.02 will provide -2% D when braking. Typical values for real tires seem to be around -0.02, but it is an argued topic. It is possibly down to individual tire characteristics.

[REAR] ; same as the FRONT tires, skipping everything.
[…]

[THERMAL_FRONT] ; SYNTAX: Add "_X" for every further compound. Example: THERMAL_FRONT_1 for the 2nd tire set in the index.
SURFACE_TRANSFER=0.017 ; How fast external sources heat the tyre tread touching the asphalt: Values 0-1
PATCH_TRANSFER=0.00027 ; How fast heat transfers from one tyre location to the other: Values 0-1
CORE_TRANSFER=0.00406 ; How fast heat transfers from tyre to inner air and back
INTERNAL_CORE_TRANSFER=0.00093 ; How fast rolling K transmits to core

This value is used to control how the heat generated by rolling (function of ROLLING_K , tyre angular velocity, load, pressure) transfer to the tyre core. Example value: 0.004

FRICTION_K=0.03950 ; Quantity of slip becoming heat (generated by lateral sliding).
ROLLING_K=0.19 ; rolling resistance heat (generated by rolling driving straight).
SURFACE_ROLLING_K=0.75 ; Like ROLLING_K but dedicated to surfaces.

Prior to V6 the ROLLING_K value was used to generate heat as function of rolling both for Core and Surface, from V6, ROLLING_K is used for Core and SURFACE_ROLLING_K is used for Surface.

PERFORMANCE_CURVE=tcurve_conti.lut ; File to use for temperature/grip relation
GRAIN_GAMMA=1.2 ; Gamma for the curve grain vs slip. higher number makes grain more influenced by slip
GRAIN_GAIN=0.6 ; Gain for graining.

How much gain raises with slip and temperature difference- 100 value = slipangle*(1+grain%)

BLISTER_GAMMA=1.2 ; Gamma for the curve blistering vs slip. higher number makes blistering more influenced by slip
BLISTER_GAIN=0.6 ; Gain for blistering.

How much blistering raises with slip and temperature difference. Think blistering more as heat cycles. 100 value = 20% less grip

COOL_FACTOR=0.860 ; Speed up surface cooling as function of the square of the car speed. Example value: 1.5

[THERMAL_REAR]
SURFACE_TRANSFER=0.018
PATCH_TRANSFER=0.00027
CORE_TRANSFER=0.00406