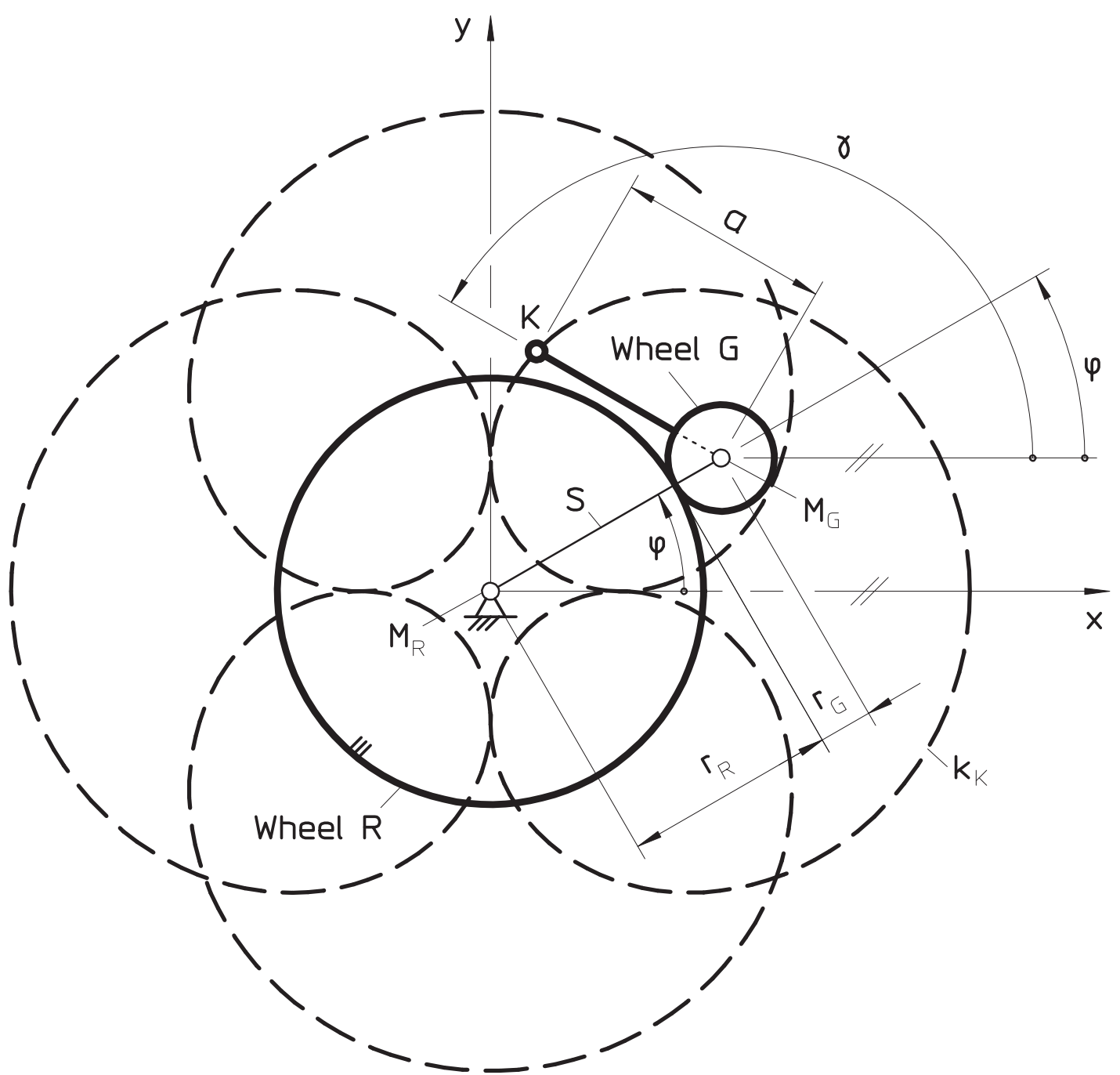


Designation	Cross Reference	Epitrochoid	Peritrochoid	Hypotrochoid	
Schematic representation ¹⁾ 1) with optical deformation	Pictures 4.16 to 4.19				
Classification				$ r_R / r_G \leq 2$	$ r_R / r_G \geq 2$
$\text{sign}(r_R) = \text{sign}(i_Z)$	[24]	+1		-1	
$\text{sign}(r_G) = \text{sign}(i_N)$	[24]	+1	-1	+1	
$i = r_R / r_G = i_Z / i_N$	[24]	0 ... +∞	-∞ ... -1	-∞ ... -2	-2 ... -1
$m = i + 1$	[24]	+1 ... +∞	-∞ ... 0	-∞ ... -1	-1 ... 0
Coordinates of the trochoid	([24])	$x = r_G \cdot m \cdot \cos(\varphi) + a \cdot \cos(m \cdot \varphi + \gamma_0)$ $y = r_G \cdot m \cdot \sin(\varphi) + a \cdot \sin(m \cdot \varphi + \gamma_0)$			
Angle γ_0 of the circle G in the initial position	Gl. 4.70	$\gamma_0 = -\text{sign}(i_N) \cdot i \cdot \pi \cdot \left(\frac{1}{2} - \frac{n_i}{i_Z} \right)$			
Quantity $\max(n_i)$ and Numbers n_i of the Transition Curves ²⁾	Gl. 4.65 Gl. 4.78	$\max(n_i) = \text{int}\left(\frac{i_Z}{2}\right); 0 < n_i \leq \text{int}\left(\frac{i_Z}{2}\right)$		$\max(n_i) = \text{int}\left(\frac{2 \cdot i_N + i_Z}{2}\right); 0 < n_i \leq \text{int}\left(\frac{2 \cdot i_N + i_Z}{2}\right)$	
Approximation equation for the angle $\varphi_{\bar{u}}$ to generate a trochoid with Selftangent Point	Gl. 4.33	$\varphi_{\bar{u}} = \varphi_{i+1} = \varphi_i - \frac{m \cdot \tan(m \cdot \varphi_i + \gamma_0) - \tan(\varphi_i)}{m^2 \cdot [1 + \tan^2(m \cdot \varphi_i + \gamma_0)] - 1 - \tan^2(\varphi_i)}$			
Starting angle φ_1 for the approximation equation	Gl. 4.48 Gl. 4.66 Gl. 4.69 Gl. 4.73 Gl. 4.75 Gl. 4.76 Gl. 4.77	$\varphi_1 = \varphi_{\min} + \frac{\varphi_{\max} - \varphi_{\min}}{4}$ $\varphi_{\min} = \frac{\pi}{m} \cdot \left(\frac{i}{2} - \frac{n_i}{i_N} \right)$ $\varphi_{\max} = -\frac{n_i \cdot \pi}{i_Z} + \frac{\pi}{2}$	$\varphi_1 = \frac{\pi}{2 \cdot i_Z \cdot n_i}$	$\varphi_1 = \frac{\pi}{4}$	$\varphi_1 = \varphi_{\max} - \frac{\varphi_{\max} - \varphi_{\min}}{4}$ $\varphi_{\min} = -\frac{n_i \cdot \pi}{i_Z} + \frac{\pi}{2}$ $\varphi_{\max} = \frac{\pi}{m} \cdot \left(\frac{i}{2} - \frac{n_i}{i_N} \right)$
Radius $r_{\bar{u}}$ of the Transition Curve ²⁾	Gl. 4.35 Gl. 4.37	$r_{\bar{u}} = -(r_R + r_G) \cdot \frac{\cos(\varphi_{\bar{u}})}{\cos(m \cdot \varphi_{\bar{u}} + \gamma_0)}$ $r_{\bar{u}} = r_G \cdot \frac{\sin(\varphi_{\bar{u}})}{\sin(m \cdot \varphi_{\bar{u}} + \gamma_0)}$			
Limits for the radius $r_{\bar{u}}$	Gl. 4.94 Gl. 4.95	$ r_G \leq r_{\bar{u}} \leq r_G + r_R $	$ r_G + r_R \leq r_{\bar{u}} \leq r_G $	$ r_G \leq r_{\bar{u}} \leq r_G + r_R $	
Radius of the BALL Curve ⁴⁾	Gl. 4.86	$r_b = \left \frac{r_G}{m} \right $			
Generation of curtate trochoids, • Minimal quantity of Self-Intersection Points • Circumstance of BALL Curve ⁴⁾	Chapter 4.1	inside of the Moving Centrode ³⁾	outside of the Moving Centrode ³⁾	inside of the Moving Centrode ³⁾	
Generation of prolate trochoids, • Maximal quantity of Self-Intersection Points • Circumstance of BALL Curve ⁴⁾	Chapter 4.1 u. 4.5	outside of the Moving Centrode ³⁾	inside of the Moving Centrode ³⁾	outside of the Moving Centrode ³⁾	
Substitution to generate same trochoid	[20]	Peritrochoid	Epitrochoid	Hypotrochoid $ r_R / r_G \geq 2$	Hypotrochoid $ r_R / r_G \leq 2$
Ratio of the substitution gear	Gl. 4.92 Gl. 4.93	$i_Z' = i_Z$ $i_N' = -(i_Z + i_N)$			
Minimal quantity n_{S0} of Self-Intersection Points	Gl. 4.96 Gl. 4.97	$n_{S0} = (i_N - 1) \cdot i_Z $	$n_{S0} = (i_N + i_Z - 1) \cdot i_Z $	$n_{S0} = (i_N - 1) \cdot i_Z $	
Quantity n_S Self-Intersection Points between Moving Centrode ³⁾ and Transition Curve ²⁾	Gl. 4.98	$n_S = n_{S0} + i_Z $			
Quantity n_S Self-Intersection Points between 2 Transition Circles n_i und n_{i+1}	Gl. 4.99	$n_S = n_{S0} + [1 + 2 \min(n_i, n_{i+1})] \cdot i_Z $			
Maximale Quantity n_{Smax} of Self-Intersection Points	Gl. 4.98 Gl. 4.100 Gl. 4.101	If Transition Curves ²⁾ are missing: If numerator i_Z of the ratio i is even: If numerator i_Z of the ratio i is odd:		$n_{Smax} = n_{S0} + i_Z $ $n_{Smax} = n_{S0} + 2 \max(n_i) \cdot i_Z $ $n_{Smax} = n_{S0} + [1 + 2 \cdot \max(n_i)] \cdot i_Z $	
Quantity n_b of inflection point	Chapter 4.5	For the area between Moving Centrode ³⁾ and BALL Curve ⁴⁾ is: This equation is valid for all other areas:			$n_b = 2 \cdot i_Z $ $n_b = 0$
Quantity n_T of Selftangent Points	Volker Jäkel 2016	This equation is valid for Transition Curve ²⁾ $n_i = \max(n_i)$ gilt This equation is valid for other Transition Curves ²⁾			$n_T = i_Z / 2$ $n_T = i_Z $
j-fold Self-Intersection Point	Volker Jäkel 2016	$a = r_G + r_R$			
i_Z is odd		$j = \text{int}(i_Z / 2) \cdot i_Z$			
i_Z is even		$ i_Z > 2 \rightarrow j = i_Z^2 / 2 - i_Z $			

²⁾ The Transition Curve of trochoids is always a circle. All points of a Transition Curve generates a trochoid with Selftangent Point.

³⁾ The Moving Centrode of trochoids is always a circle. All points of a Moving Centrode generates a trochoid with cusps (sharp corners).

⁴⁾ The BALL Curve of trochoids is always a circle. All points of a BALL Curve generates a trochoid with approximate straight-line pattern.



- Legend:
- R: Sun wheel/center gear (fixed)
 - G: Planet wheel (moving)
 - S: Movable arm or carrier (moving)
 - K: Point of wheel G creating trochoid k_K

Picture for table 4.1: Gear to generate the trochoid k_K